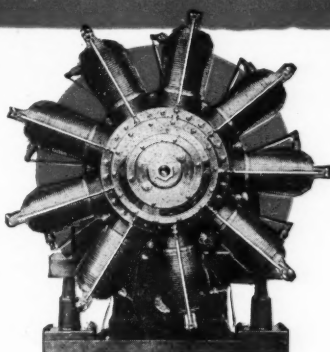


# MOTOR AGE

Vol. XXXIII  
No. 14

CHICAGO, OCTOBER 4, 1917

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Three dollars a year



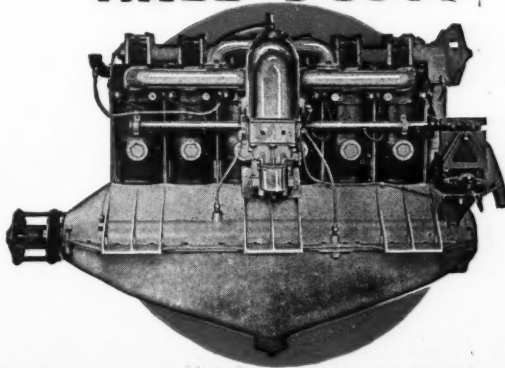
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# MOTOR AGE

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An article on how to prepare the motor car for winter will be the feature of Motor Age for next week. In it you will learn just what ills a car is likely to incur in cold weather and how these ills may be avoided.

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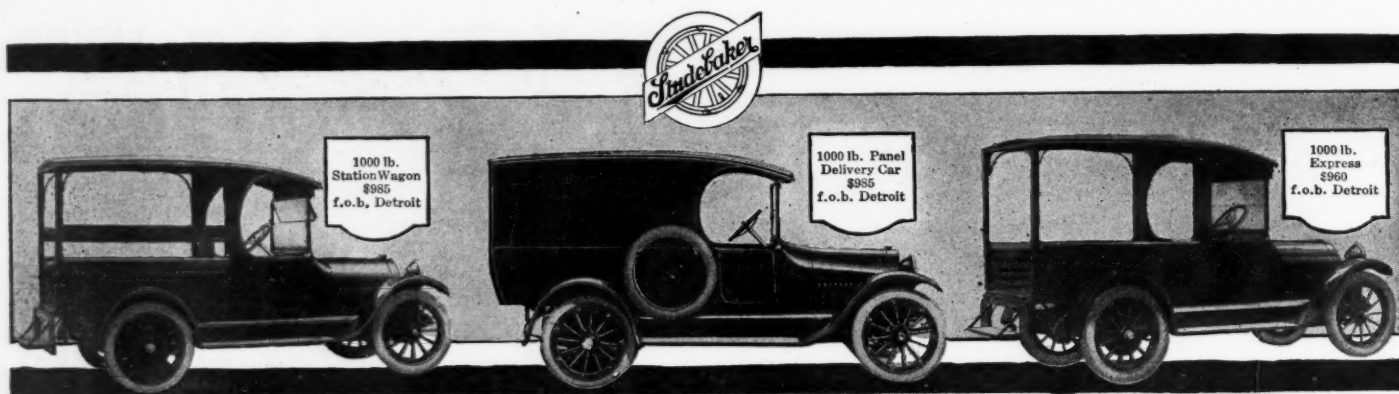


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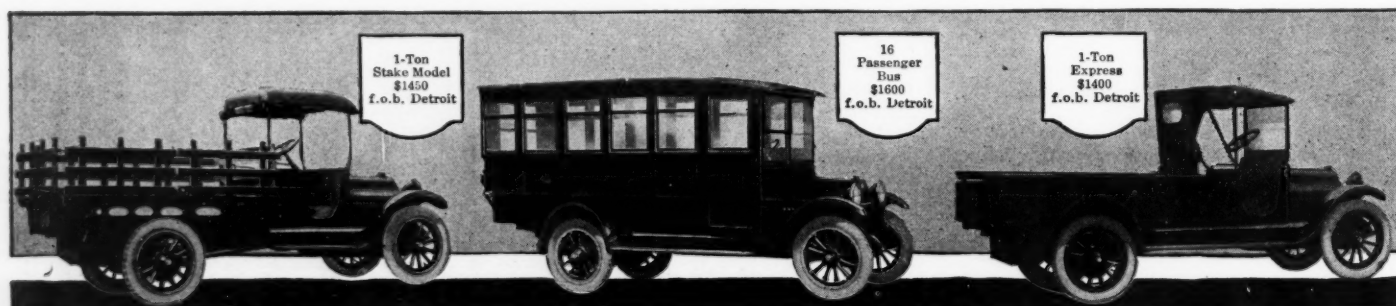
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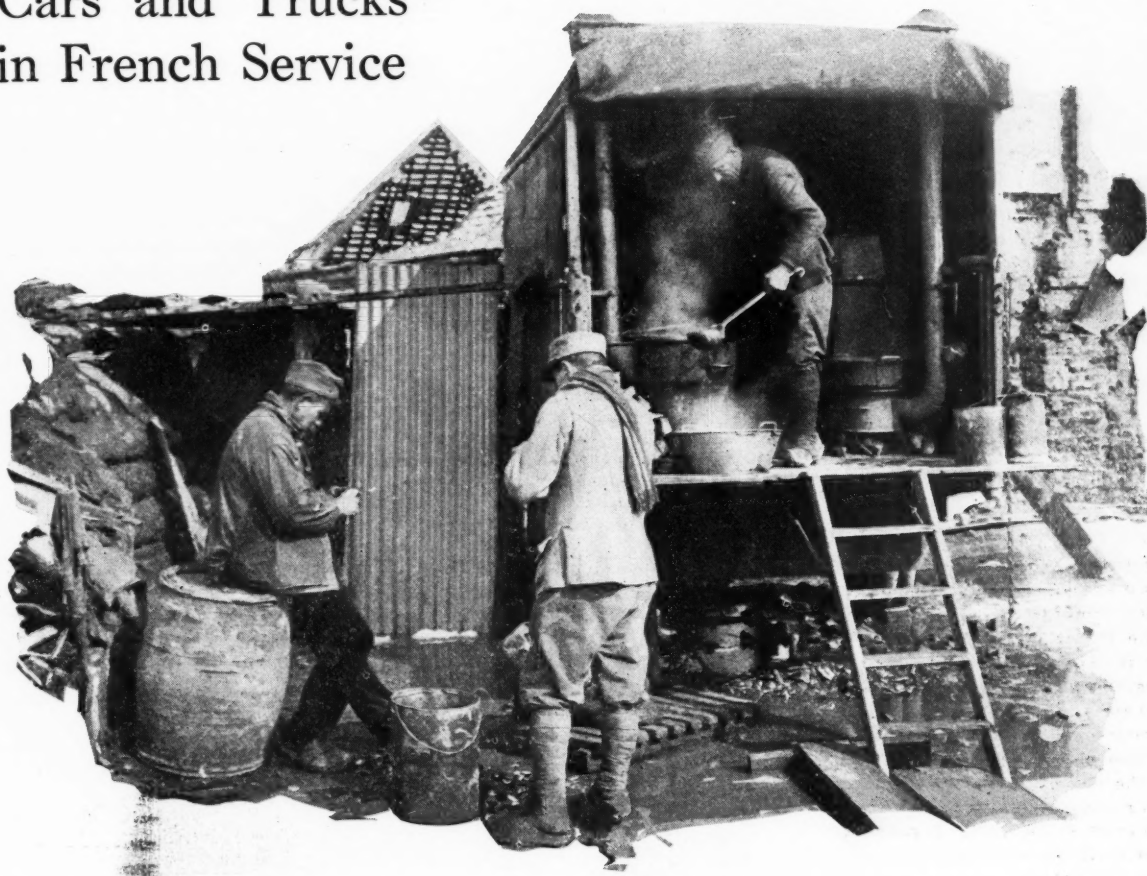
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# MOTOR AGE

## Organizing the Army's Motors

### Cars and Trucks in French Service



The drivers of the motor cars and trucks are fed well whenever possible. Kitchens are mounted on two-wheel trailers as here

By W. F. Bradley

*Motor Age's correspondent with the Allied armies*

THE motor car service of the French army is a vast organization equipped for every conceivable kind of haulage and at the disposal of every branch of the army. The variety of work done by ordinary army trucks is greater than that undertaken by any civilian haulage contractor, for the underlying principle is that the trucks shall be at the disposal of the entire army; while one branch may be inactive and have no need for mechanical haulage, another may be passing through a period of intense activity. Thus, for the truck service there are no periods of complete rest, such as are known by the infantry, cavalry, artillery and the various technical branches of the army. Truck efficiency demands that vehicles shall be run as constantly as possible, and this car con-

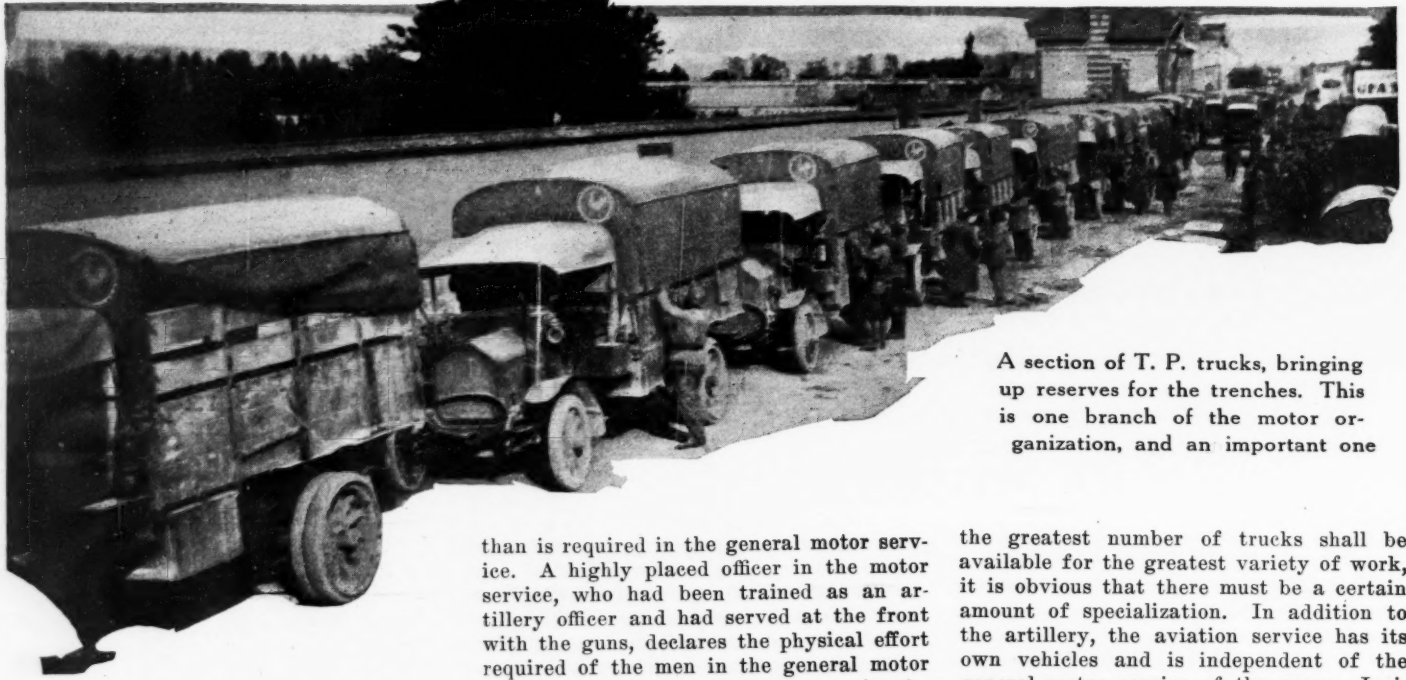
dition is obtained by non-specialization, the whole of the motor fleet being at the disposal of the whole of the army and for the varying needs of that army.

To give specific instances, when an army is consolidating its positions, with no intention of attacking for a considerable time, the amount of ammunition to be carried to the front is reduced to a minimum; but at such a time the amount of material required for new gun emplacements, new trenches, shelters, bridges, etc., is at its maximum, and trucks are kept busy on this class of work. When a big attack is imminent, consolidating operations practically are suspended, but at such a time the number of men in the trenches and held in reserve immediately behind the front line positions is at its maximum; thus the

trucks which a few days before were carrying building material are all employed on the transportation of men, the supply of food and water for the men at the front and also the increase of the quantity of reserve ammunition in the "dumps" behind the batteries.

In the French army the artillery is independent of the general motor service for the transportation of its material. This condition is not common to all the armies of Europe, and even at the present time there is a certain amount of discussion in technical circles as to the value or otherwise of the French system. It is only for the haulage of heavy artillery that motors are used to the exclusion of horses. The light 75-mm. field piece presents a special problem; it must possess extreme mobility





A section of T. P. trucks, bringing up reserves for the trenches. This is one branch of the motor organization, and an important one

and be capable of getting into any position. The best results have been obtained by mounting the gun on a special motor chassis, having nothing in common with the truck chassis, and firing it from this chassis. The largest gun carried permanently on and fired from a motor chassis is one of 102 mm., used by a certain Allied power.

#### Tractors for Artillery

With these exceptions, artillery always is hauled instead of being carried, and this necessitates a special type of tractor which in the French army drives through all four wheels. The motor-hauled batteries keep these tractors exclusively for their own use and also have a certain number of trucks for carrying ammunition from the dumps to the guns. Thus the batteries are entirely independent of the general motor service for their movements, although they still have to rely on the ordinary trucks for the carriage of their ammunition from rail-head to dump. Under this system when a battery receives orders to advance or retreat it can get under way as quickly as the guns and caissons can be hitched up to the tractors; there is no need to communicate with an outside service or to wait for trucks or tractors to be sent up. The main objection brought against this system is that the tractors are not employed to anything like their full efficiency.

If a gun takes up a position and retains it for a month, the tractor remains idle for that length of time, only a few yards from its gun, hidden under the cut branches of trees or by other covering to screen it from the eyes of aerial and terrestrial observers. As to which is the better system, that depends to a large extent on the nature of the front. In the mountains a big gun can be screened with comparative ease; in the plains there are less opportunities for hiding, thus every gun has emplacements and changes its position at frequent intervals. The problem is one for military authorities only; for the motorist it is sufficient to note that the artillery service calls for less physical effort on the part of the men

than is required in the general motor service. A highly placed officer in the motor service, who had been trained as an artillery officer and had served at the front with the guns, declares the physical effort required of the men in the general motor service is ten times that of men in the heavy artillery. Motor vehicle drivers in the general service frequently work 16

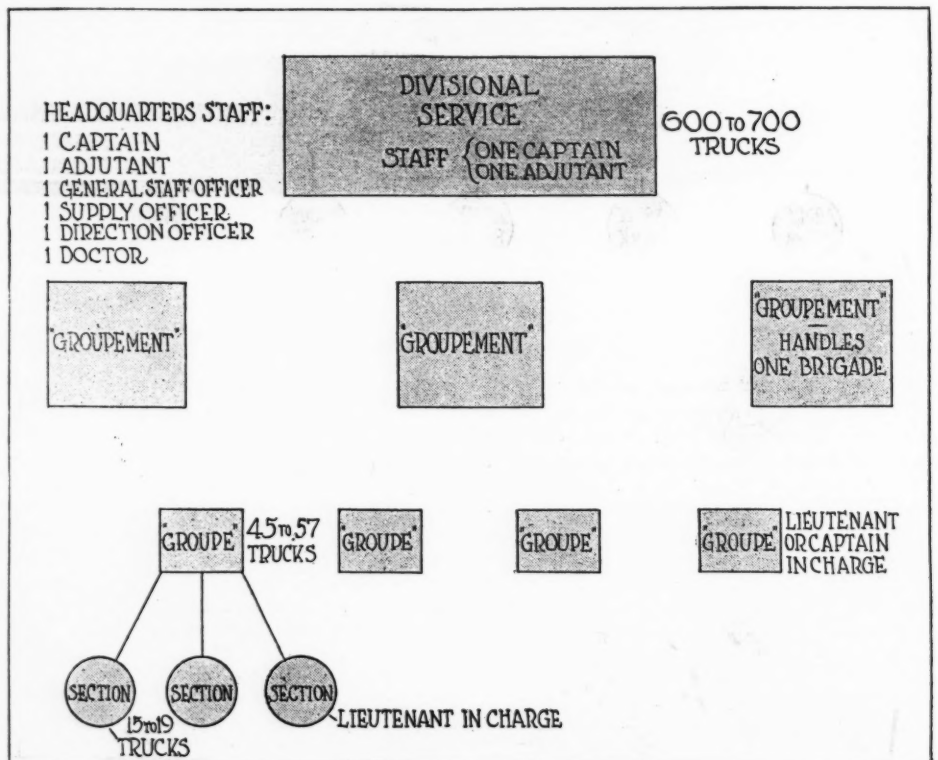
**I**n the general motor service there are three classes of trucks, which, in order of importance, are: Transport of Material, usually known under the abbreviation T.M.; Transport of Personnel, T.P.; and fresh meat wagons, R.V.F. The T.M. trucks form the backbone of the motor service of the army.

hr. a day for considerable periods, while in times of military activity three consecutive days without rest are not uncommon.

While the underlying principle is that

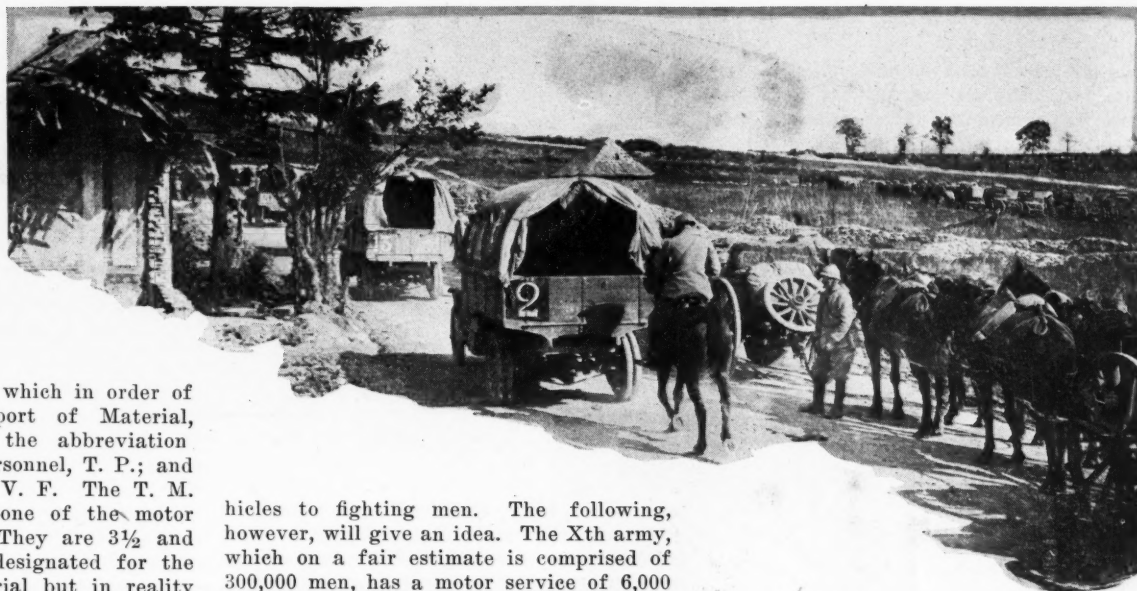
the greatest number of trucks shall be available for the greatest variety of work, it is obvious that there must be a certain amount of specialization. In addition to the artillery, the aviation service has its own vehicles and is independent of the general motor service of the army. Incidentally it may be mentioned that no animal traction is provided for in the aviation service, all the material and sheds being transported on special trucks. The telegraphers and observation balloon corps, these latter being a part of the artillery, have their own motors; tanks are also a part of the artillery and as such independent of the general motor service. It is obvious, too, that such vehicles as gasoline locomotives running on rails, road rollers, water sprinklers, tank wagons, etc., are too specialized to be used for anything but the work for which they were primarily designed.

In the general motor service there are



How the service department in a French army division is grouped. This division is for supplies only and not for artillery

A section of army motor trucks in close formation enroute to the trenches "somewhere in France"



three classes of trucks, which in order of importance are Transport of Material, usually known under the abbreviation T. M.; Transport of Personnel, T. P.; and fresh meat wagons, R. V. F. The T. M. trucks form the backbone of the motor service of the army. They are 3½ and 5-ton trucks officially designated for the transportation of material but in reality employed for every conceivable kind of work in the army and at the disposal of every branch of the army which may happen to require their services. For these trucks there is no slack time, no waiting for events.

If a quick movement of troops has to be made, the T. M. trucks come to the aid of the special vehicles for carrying men; if the artillery is unusually active the T. M. trucks carry shells from the rail head to the dumps or the batteries; if there is a big demand for timber the T. M. trucks go to the aid of the forest gangs; the call is the same if there are big bridge-building, road-repairing, or trench-making operations. The T. M. service is the general haulage contractor of the army.

It is difficult to state with any degree of accuracy the proportion of motor ve-

hicles to fighting men. The following, however, will give an idea. The Xth army, which on a fair estimate is comprised of 300,000 men, has a motor service of 6,000 men and 150 officers. As there are always two men to the truck, this gives a ratio of one motor truck to 100 fighting men. This calculation, however, only takes account of the general motor service comprised of T. M. and T. P., trucks, meat wagons and

**T**HE Xth army, estimated at 300,000 men, has a motor service of 6,000 men and 150 officers. This gives a ratio of one motor truck to 100 fighting men. Adding the general motor service, all officers' cars and so on, there is one motor vehicle for every forty men in the field.

ambulances. It is necessary to add all officers' cars, the artillery tractors and motor cars, the airplane service and the various specialized vehicles already mentioned. On this basis there is one motor

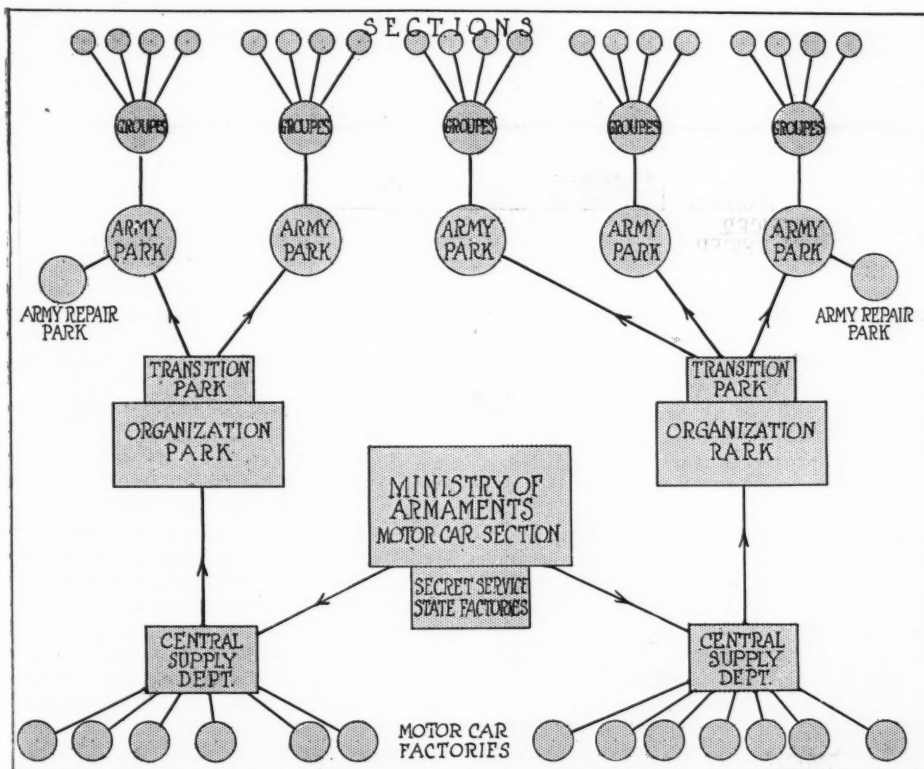
vehicle for forty men in the field. In this connection consideration has been taken only of troops and motors in the field; the immense services in the interior, carrying on work which makes it possible to maintain the fighting forces, all have their own motor services.

When war broke out the only properly organized and really efficient section of the motor service of the army was that dealing with the transportation of fresh meat. This had been developed during the annual army manoeuvres and automatically went into service with the mobilization order. Where it is now considered necessary to have a fleet of 600 to 700 motor trucks for service with one division, the whole of the transport service in those early days was dependent on not more than 200 horse wagons. In consequence the motor meat trucks carried every conceivable kind of load. In the words of one officer who went into service on the first day of the war:

"We went out with fresh meat and we came back with human meat. We took ammunition, timber, barbed wire, blankets, medical stores, reserve troops, then went back for more quarters of beef, after washing the bus out—if we could find water, or had time to use it."

#### T. M. Trucks

Army T. M. trucks are formed into sections which originally were comprised of twenty vehicles. The number of trucks in a section has undergone variation, and at the present time it is fifteen trucks of 5-ton capacity or nineteen trucks of 3½-ton capacity. The basis appears to be that one section shall be able to supply and transport one company, say 200 men. It should be understood clearly, however, that no company has a proprietary claim on any section, nor has any battalion, regiment, brigade or division any right to monopolize the services of any special vehicles. The fighting troops may go into rest quarters; the motor service continues at work. Each section is commanded by a lieutenant, who has at his disposal a touring car and driver, as well as a motorcyclist. The lieutenant is responsible for the effective working of his section,



Grouping of complete motor organization, with the motor car section of the Ministry of Armaments as the base of motor operations





American trucks in the Transport of Material service. Right here they are taking on soldiers who have just come out of the trenches

whether it be operating as a whole, or, as is often the case, split up into subsections of five vehicles; for this work a touring car is indispensable.

On an average there are forty to fifty men in a section, these being two drivers a truck, two mechanics for the section and two cooks. The repair facilities at the disposal of a section are limited to a bench, vise and kit of hand tools. Spare parts are nuts, bolts, washers, spark plugs, packing, etc., or only such parts as are common to all makes of trucks. There are no valuable spares on a section.

#### Held in Reserve

On one portion of the French front I came in contact with three sections of Pierce-Arrow 5-ton trucks, which at that particular time were being held in reserve. They were on a road with no outlet, but in accordance with the general rule were lined up on the sidewalk, sheltered by the trees from enemy observation, and also leaving the full width of the road free for traffic. Each truck had attached to it a two-wheel trailer which appeared to have been designed originally to increase the carrying capacity of the truck when removing troops. In practice, however, the trailers were made use of as workshop, cookhouse, stores and, in a few cases, sleeping quarters. The whole of this district had been fought over and left in a wrecked condition, so that the convoys in addition to carrying a useful load had to bring with them all the material necessary for housing the men. When, as in this case, no permanent buildings could be obtained, the sleeping accommodation of the men consisted of light tents. These, together with the trailers, formed a permanent base from which the convoy operated; yet the whole of the material could be packed up and moved, together with a useful load aboard the trucks, within an hour after notice.

The greatest strain is put on a convoy in a war of movements, for then the maximum amount of transportation has to be undertaken and camp has to be changed at very frequent intervals. Permanently established, the cook can fix up a commodious kitchen and prepare meals under very satisfactory conditions; but when on the move, or liable to be called upon to move at a moment's notice, all cooking has to be done within a two-wheel trailer, under conditions which obviously are not

**F**OR the motor truck service there are no periods of complete rest such as are known by the infantry, cavalry, artillery and the various technical branches of the army. Truck efficiency demands that vehicles shall be run as constantly as possible, and this condition is obtained by non-specialization, the whole of the motor fleet being at the disposal of the whole of the army and for the varying needs of the army.

ideal. With their native ingenuity motor convoy men left in one emplacement for a few weeks at a time can get together a camp not at all lacking in home comforts and without any monetary expenditure. Whatever is of an untransportable nature or interferes with the normal work of the convoy has to be left behind when quick movements are ordered; then the men are entirely dependent on what can be carried with the convoy.

The use of trailers merely as an auxiliary for the convenience of the men, without any idea of increasing the load-carrying capacity of the unit, is particularly good. The men in the motor service section of the army have their own co-operative society, with headquarters in Paris, from which they can obtain extra supplies and delicacies at prices calculated to make civilians envious. These three sections of Pierce-Arrow trucks had one covered

trailer equipped with a small grocery store. The soldier in charge of this vehicle received his supplies from the central stores in Paris and retailed them to the men of his sections at cost price. If the order came to move, it was only necessary to close the doors, hitch up to a truck and knock the props away from under the trailer. The repair department for a section is handled in the same way, the two mechanics in charge having a trailer within which all tools and supplies are kept in racks or pigeon holes. Simple work can be done under cover, but usually a rough shed or tent is erected by the side of the trailer to give additional room.

#### Structure of Unit

The unit in the motor truck service is a section, which, as already stated, may be comprised of from fifteen to nineteen trucks, according to their tonnage, plus, in certain cases, a trailer for each or some of the vehicles, plus one touring car and one motorcycle. Three sections form a group which may have from forty-five to fifty-seven trucks, plus, of course, the touring cars and motorcycles for the individual sections.

A traveling workshop is attached to each group. It is mounted on a trailer and is capable of doing all the running repairs of the group but is not provided with power. Four groups form a groupement which will unite, together with officers' cars and motorcycles, from 204 to 258 vehicles. The groupement has a very complete repair outfit, with power, capable of doing complete overhauling and in addition has attached to it seven or eight service trucks and touring cars for the staff officers. A motor service groupement is an absolutely self-contained and self-supporting mobile organization. It carries a very complete supply of spare parts; is in touch with the permanent stores at the rear for the maintenance of its stock;



there is practically no limit to the repair work it can undertake, while it is capable of following up and keeping in touch with the different groups and sections dependent on it when movements are ordered. A *groupe*ment is capable of handling the transport of a full brigade. Its headquarters staff consists of a captain in command, an adjutant, an officer detached from the army headquarters, a supply officer, a direction officer and a doctor. From the administrative standpoint three, sometimes four, *groupements* constitute a general reserve with a headquarters staff consisting of a captain and an adjutant. Incidentally American volunteers now are manning at least one such general reserve and are thus responsible for the transportation of three brigades.

#### Organization of Units

Between the factories which produce motor vehicles and the units which make use of them in the field it has been necessary to build up an organization which at first sight looks complicated. Cleared of many of its details, such an organization is shown in the accompanying diagram. Orders for motor vehicle material come from the motor vehicle section of the Ministry of Armaments, which acts through the central supply departments. There are only two of these departments in France, one being in the neighborhood of Paris and another in the Lyons district. Acting on instructions from the Ministry, the central supply departments place the contracts with the factories and take delivery of the goods. The detailed work of this department is more elaborate than would appear at first sight. Trucks are not always received complete but in chassis form, lacking many of the necessities for war service. The central supply department equips them either in its own shops or in controlled establishments and distributes them to an organization in the field.

#### Trucks from Italy

Methods of delivery from the factory to the supply department have to be considered. When the two are in the same town the task is easy. But in the case of Fiat, for instance, which has its factory in Turin, Italy, and has to deliver over the Alps to a town in France, a special organization becomes necessary. Every day the Fiat factory forms a convoy of thirty to forty trucks and sends these out in charge of factory testers—one man to a truck—to a frontier town 6000 ft. above sea level. Here French soldiers are waiting to drive the trucks direct to the central supply department, a distance of about 150 miles. Many of the trucks are not fitted with bodies, the French preferring to do this work themselves. Thus a rough wood box to carry a load of sand is fitted, and the driver has a very light airplane seat. On reaching their destination the airplane seats are dismounted by unscrewing four bolts and handed over to a transportation agent who returns them in lots to the factory. The boxes are not of sufficient value to be returned. This method of delivery is quicker than rail. Although there is an examination and test at the Fiat factory, the trip by road eliminates any necessity for a test at the central supply department, for the total run

is more than 200 miles, all over mountain roads. When the factory and the supply department are in the same town, there must be a special road test before a truck can be sent to the front.

Leaving the central supply department fully equipped for war service and manned by army trained drivers, the trucks move up to an organizing park. All the organizations mentioned up to this point are under the control of the Ministry and not of the army. On the next stage they pass into a transition park, attached to the organizing park but, unlike this latter, being under army control. The transition

**T**HE aviation service has its own vehicles and is independent of the general motor service of the army. No animal traction is provided for in the aviation service. All the material and sheds are transported on special trucks. The unit in the motor truck service is a section, which may be comprised of from fifteen to nineteen trucks, according to their tonnage, plus, in certain cases, a trailer for each or some of the vehicles, plus one touring car and one motorcycle. Each group has its motor workshop.

park distributes the trucks to the army parks to which they will remain attached permanently so long as they are in the field. The army divisions are *groupement*, *groupe* and finally sections of fifteen to twenty trucks which generally work together under the control of a lieutenant.

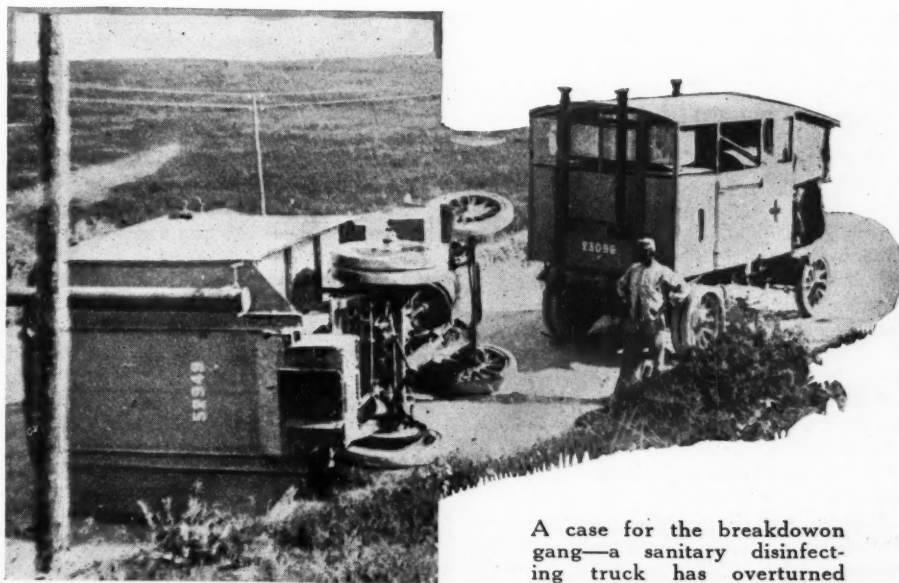
A revision park is a permanent establishment with a temporary foundation. There are about a dozen such establishments back of the French armies, in towns within the war zone but sufficiently far removed to receive nothing more than an echo of the fighting. Only in case of an unusually important advance would it be necessary to change the location of a revision park, and even then adequate warning would be given. In these parks there is a close approximation to factory conditions, with the difference, however, that the staff has to erect its own shops, with the knowledge that at some date they will have to be pulled down and thrown away, and

that the entire staff must be housed and fed.

Although all the men are soldiers, the working conditions are no different from those of any civilian factory. The men feel that they are working as mechanics and not as soldiers, and for this work they are receiving the army pay of 5 cents a day; other men, doing exactly the same work, but who happen to have been demobilized and sent to the motor car factories at the rear, are receiving the standard wages of 25 to 35 cents an hour. This raises a very delicate problem, for it is no easy task to maintain output and keep up a high standard of efficiency with very little incentive and with the demoralizing knowledge that other men are doing the same work under so much more advantageous pecuniary conditions. Because of this, the suggestion has been made to put on a civilian basis all such establishments. It requires more patient enthusiasm to carry on such work day after day than to take an active part in the military operations at the front. Credit must be given to the French army mechanics for the good spirit they have displayed in duty of such a monotonous nature; the officers, too, are willing to recognize that the men are, in reality, more mechanics than soldiers and invariably take particular pains to see that their food is entirely satisfactory and housing good. Although the majority of the men sleep in camp adjoining the park, permission readily is given to lodge in town when the men desire it and the service is not interfered with thereby.

#### Supplied with Light

One revision park, which is typical of the others, had been established in a grain warehouse in a town 35 miles back of the lines. The town supplied electric power, but a dynamo and electric motor had been fitted as a precaution, and all the power-driven machinery—lathes, milling machines, drill press, saws, etc.—had been erected in the permanent building. Beyond this, on vacant ground, had been erected long series of temporary wood and canvas sheds to be used for dismounting and as fitting shops.



A case for the breakdown gang—a sanitary disinfecting truck has overturned

## Coffin May Head Board

Civilian to Direct Work of Aircraft Production According to Bill Just Passed

Measure Carries With It Appropriation of \$694,000,000

CHICAGO, Oct. 1—The passage of the Sheppard-Hulbert bill as amended by the House without a dissenting vote augurs well for the future of aviation in that it gives a legal status to an aircraft production board. The bill provides for a board of nine members and carries with it an appropriation of \$694,000,000. The personnel will include three naval and three army experts and three civilians, all appointed by the President. It is reported that the chairman, who is to be a civilian member, will be Howard E. Coffin. It also is expected that F. A. Deeds will be a member, though the position of Sidney D. Waldon is not certain.

Preliminary specifications for international standards of airplane materials are being issued by the International Airplane Standardization Board in Washington. The work is under the direction of F. G. Diffin, and copies of the standards adopted may be obtained by interested manufacturers on application to the International Aircraft Standards Board, 224 Bond building, Washington, D. C.

Developments in the motor industry in regard to airplane manufacture continue. The Weger Aeronautical Motor Co. has been formed with a capital of \$200,000, with A. L. Hammink as president; C. B. Cortlett, vice-president; and S. G. Fleisher, secretary and treasurer. The company is allied with the Weger Motor Co., which owns patents on aeronautical engines, and arrangements have been made for production with royalties.

### Production Increasing

Wright-Martin gradually is increasing production. In August the output was sixty-five engines, or three a day. Early in September the output was at the rate of five a day. The Lincoln company expects to work 5000 men as soon as it attains full production. Curtiss continues to expand. It has considerably in excess of \$50,000,000 worth of orders, it is stated, and is investing about \$4,000,000, exclusive of machinery, in its new plant.

The total capital invested by Curtiss at Buffalo this year is between \$6,500,000 and \$7,000,000. The new plant, covering space equivalent to 100 ft. by 2½ miles, will be used for the manufacture of planes alone. Additional space in the old plants has been obtained by the removal of the experimental plant to Garden City, L. I., where 20 acres adjoining the Mineola flying fields have been obtained. A new corporation has been organized, the Curtiss Engineering Corp., and will handle all the developmental and experimental work at Garden City. G. H. Curtiss is president of the new concern.

France has been experimenting with stretchers on planes. Three tests made last Saturday with an airplane fitted with two

stretchers for wounded were highly satisfactory. A physician and a corporal represented the wounded during a 12-min. flight, which is equivalent to a 15-mile journey.

France also is helping to build the new Liberty engine, according to all signs. It is learned that the recent purchase of \$3,000,000 worth of machine tools by the J. G. White Engineering Corp. was to equip the plants of the Brasier Automobile Co. and the Renault Automobile Co. in France to produce Liberty engines.

### CONFER ON TRUCK ENGINES

Washington, D. C., Oct. 2—Special telegram—Conferences were held Tuesday here between representatives of the Quartermasters' Corps, Christian Girl, head of the production board of the standardized military truck, and manufacturers of engines on the contracts for the building of engines. Mr. Girl said nothing would be known as to the letting of motor contracts for several days. A similar conference will be held soon touching on contracts for putting together the standardized trucks and the splitting up of orders for parts, etc., by representatives of the Corps, Mr. Girl and other makers. Nothing as to parts divisions and assembling standardized trucks, however, will be known for thirty days it is stated officially.

### Save the Gasoline!

#### Suggestions Made by the N. A. C. C.

- 1—Do not use gasoline for washing or cleaning—use kerosene to cut the grease.
- 2—Do not spill gasoline or let drip when filling—it is dangerous and wasteful.
- 3—Do not expose gasoline to air—it evaporate rapidly and is dangerous.
- 4—Do not allow engine to run when car is standing. Cars are fitted with self-starters and it is good for the battery to be used frequently.
- 5—Have carbureters adjusted to leanest mixture possible—a lean mixture avoids carbon deposits.
- 6—See that piston rings fit tightly and cylinders hold compression well. Leakage of compression causes loss.
- 7—Stop all gasoline leakage. Form the habit of shutting off gasoline at the tank or feed pipe.
- 8—See that all bearings run freely and are well lubricated—friction consumes power and wastes gas.
- 9—Protect the radiator in cold weather—a cold engine is hard to start and is short in power.
- 10—Keep the tires fully inflated—soft tires consume power.
- 11—Do not drive at excessive speed. Power consumption increases at a faster rate than speed. Every car has a definite speed at which it operates with a maximum fuel economy.
- 12—Change gears rather than climb hills with wide open throttle—it saves car and gas.
- 13—Do not use cars needlessly or aimlessly. By exercise of forethought a number of errands can be combined so that one trip to town or elsewhere will do as well as two.
- 14—Reduce the amount of riding for mere pleasure by shortening such trips or cutting down their frequency.

## Lower Gasoline Possible

Report of Trade Commission Brings Hope That Fixed Price Will Be Less

Need for Economy Increasing with Growth of Demand

CHICAGO, Oct. 1—The principal feature of the August summary of crude petroleum production and movement is that it shows an increase of some 4,000,000 bbl. of 40 gal. each, or 160,000,000 gal. Were it not for the constantly increasing demand for gasoline, these figures might be cause for joy indeed, but no increase that is in the limits of possibility can get away from the necessity for conservation of gasoline.

Since the appointment of Joseph R. Guffey as petroleum administrator to supervise the purchases of petroleum products both for the United States and its allies, there has been a feeling that immediate measures looking toward a general reduction in the prices of fuel oil and gasoline are contemplated by the Government.

With gasoline at \$1.12 in England and, coming closer to our Government, \$1 per in Cuba, not to neglect rising fuel prices here, it must be admitted there is cause for economy. The federal trade commission has completed and turned over to President Wilson cost of production estimates for fuel oil and gasoline for most of the distributing districts of the country. These estimates are said to show that it now costs from 14 to 20 cents a gallon to produce gasoline and from 90 cents to \$2 to produce fuel oil.

Whether or not this feeling that the prices will be reduced has cause for being remains to be seen. There is the other side to the question that the President will fix prices merely, and whether they will be lower will depend largely on market prices. Just now market prices are said to be above the figures recommended by the commission, which were based on production costs. If costs increase as the oil men say they have been during the last rises in price to consumer, before the fixing is reached market prices may be entirely different.

Gasoline already is on the list for which license must be obtained for export to neutral countries, though, of course, our own demands and those of the allied nations are not included in this license requirement, and are the largest factors in the supply. Sweden has just issued a royal decree to conserve the supply and enforce economy in its use.

### INCREASE GASOLINE TWELVE FOLD

San Francisco, Cal., Oct. 1—Special telegram—Announcement was made here today that the United States Government has accepted the free use of a process discovered by Frederick A. Kormann, a San Francisco chemist which is claimed to increase the output of the country's gasoline twelve fold, and thus avert a national shortage, which Government officials have declared is threatened.



# 3 Per Cent Tax on Cars

## Makers Are Made Responsible for Payment of War Levy

**M**OTOR Cars, motor trucks, motor boats, and motorcycles will have to pay a 3 per cent war tax. This has been decided by the Conference Committee, which is a combination committee made up from the Ways and Means Committee of the House and the Finance Committee of the Senate. It is practically settled that this 3 per cent tax to be paid by manufacturers on the price of the vehicle as sold to the distributor will stand. Although the measure is not yet a law but only a report from the Conference Committee, it is accepted generally that it will not be changed. This means that manufacturers of motor cars, trucks, motorcycles and motor boats will be held responsible by the Government for this tax. As mentioned last week, it has been suggested by the Conference Committee in Washington that this tax be passed on to the wholesaler or dealer and that in turn he will pass it on to the consumer. It is certain the consumer will have to pay it, but it is not known whether he will pay it as a special war tax, or in the form of an increased price on the vehicle. As prices have been increasing very much during the last year and sales diminishing it is questionable if prices will be raised rather than that the revenue will come as a war tax.

### In Effect Soon

Cars, motorcycles, motor trucks and motor boats in the hands of retailers when this war tax goes into effect will be exempt. Such vehicles held by wholesalers will be subject to a tax of 1½ per cent. It is not known when the law will go into effect but undoubtedly as soon as the measure can be made a law.

The present situation leaves it up to the retailer to secure the tax. This is the case unless the manufacturers generally increase their prices to provide for it. Should the manufacturers not do this then the distributors and the retailers will undoubtedly be called upon by the manufacturer to provide the tax. Naturally the manufacturer will bill the dealer. The dealer will have to sell the car at an increased price or sell it at the low price with a special war tax added.

The difference in price to the consumer will range from \$10 up. On a car that a dealer buys for \$800, the war tax will be \$24. On a car the dealer buys for \$2,000 the tax will be \$60.

The present tax of 3 per cent which finally was adopted is really a compromise by the Conference Committee. The Ways and Means Committee of the House, which started drafting this war measure, first determined upon a 5 per cent tax. The Senate would not agree to such. The Senate Finance Committee, a committee of the Senate which had to draft a revised tax, did not favor taxing manufacturers but proposed a Federal license tax on all cars in the hands of owners. The two committees when they met in conference would

not agree on either, and as a result the 3 per cent manufacturers' tax stands as a compromise.

It is rumored here that the House representatives on the Conference Committee were opposed to the Federal registration tax on the ground that it might influence the voters, whereas if the matter were passed on to manufacturers such would not be the case. It does seem as if the present method is a new way of chasing around the bush and that while there will not be a Federal license tax the car owner will have to pay the bill.

It cannot be conceived why a tax should be placed on motor trucks. The members of the Conference Committee have declared that the present 3 per cent tax is purely discriminatory. They declare that revenue is needed and that taxing trucks is a possible source of revenue. It seems as if those on the Conference Committee consider motor trucks a luxury. As it is trucks, motor cars, motorcycles and motor boats have been classed with talking machines, cosmetics, jewelry, motion pictures, etc. Other lines of goods that are taxed similarly, such as musical instruments, motion picture films, sporting goods, cameras, chewing gum, are let off easier with a 2 per cent tax; perfumes are taxed but 2 per cent. On the other hand all other types of transportation, such as bicycles, horse carriages, horse wagons, and, in fact, everything else are exempted.

Manufacturers do not believe the new tax will have an important effect on the motor car industry although they anticipate a slight decrease in business which always follows an increase in cost. None of the manufacturers has arranged definitely the plan of procedure following the passing of the law, but the general impression is that all manufacturers will pass the tax to the consumer through the distributor and the dealer, allowing the dealer either to add to his selling price or to add separately to the transaction sufficient to include the cost of the tax.

The Ford Motor Co. anticipates some

### What the Dealers Say

**E**XTENSIVE investigation among dealers and distributors all over the country reveals an overwhelming sentiment in favor of adding the 3 per cent war tax to the price of the car when sold and making the purchaser pay it just as he now pays the freight. This, says the dealers, is the only logical method. Plans to increase the list price of cars so as to make the purchaser pay the tax but in an indirect manner are frowned upon. Neither will the dealers consider any plan to absorb the tax themselves in whole or in part, pointing out that the margin of profit is already so narrow that it would not stand such a reduction.

such plan as this but cannot say definitely what it will do until Ford officials hold a conference this week. The Buick Motor Co. will hold a conference later in the week to decide upon its plan. Neither Chalmers or Maxwell have made any arrangements to care for the increase and will be unable to provide for it through the present prices but anticipate that the tax will be passed on to the consumer through the distributor and dealer. The Paige Motor Car Corp. has arranged with dealers through contracts made in the last six months that the dealer will have to care for any tax imposed and at his option can pass it on to the consumer. The Hudson Motor Car Co., Packard Motor Car Co., Reo Motor Car Co. and other concerns take the same view of passing the tax on to the consumer. Many of the executives of these concerns believe that the tax will cause harm among the dealers inasmuch as many dealers will sacrifice part of the tax cost in the effort to sell the cars, and all manufacturers take the view that the tax should have been placed directly on the motorists of the nation rather than the indirect tax now contemplated.

There are between 70,000 and 100,000 motor cars in the hands of dealers and distributors throughout the country on which the tax of 1½ per cent is applicable.

### What Detroit Says

The following questions were asked of various Detroit distributors and dealers, concerning the effect of the War Revenue Bill:

1—Will the past price increase cover this tax, and allow the dealer to deduct it from his profit without passing it along to the consumer; or

2—Is it best to collect this tax direct from the car purchaser, as a direct war tax, without advancing the present price, or

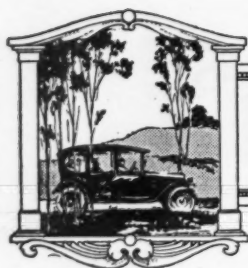
3—Should the prices be adjusted to include the war tax?

The majority of the dealers seemed to feel that the tax should be absorbed by the buying public as their contribution to the war fund, and that the prices of the cars should be revised to include this tax. For example, if the price of the car before the tax was \$2,000, the price advertised, including the tax, would be \$2,060, and the cars should be sold on that basis.

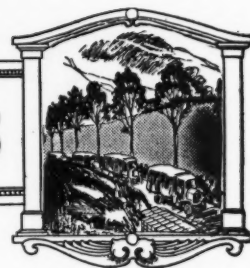
This in many respects seemed to them to be the better way. Particularly in the lower-priced cars, which are sold on a close margin of profit, the profit would not stand the war tax. Selling effort would be increased by advertising the cars at one price and then demanding an excess charge afterward to include the tax. Besides, if the tax were placed as an extra, there would be a temptation to many dealers to assume the tax themselves, which would tend to unsettle business conditions as

(Concluded on page 13)





## EDITORIAL PERSPECTIVES



### Taxing War Essentials

**P**ATRIOTISM seems to be rewarded quite poorly with our present Conference Committee at Washington, which is responsible for drafting the war tax of 3 per cent on motor cars, motor trucks, motorcycles, motorboats, etc.

**T**HERE is no more patriotic industry than the motor car industry. Witness the co-operation which the Society of Automotive Engineers and its many members have given the Government since the start of the war. These members are giving their time free of charge. Our engineers have united in the development of the Liberty aviation motor. Our engineers are working on the development of two models of military trucks, many of them without a cent as recompense. Our motor car governing bodies went on record as favoring every form of co-operation with the Government. Notwithstanding all of this co-operation, these industries have been singled out from among all other transportation industries and made the special object of a 3 per cent war tax.

**I**F we are going to tax motor cars, motor trucks, motorcycles and motorboats, then we cannot see why we should not tax railroad locomotives and railroad cars. We do not see why steamboats should not be taxed. We cannot see why every horse vehicle in the country should not be taxed. We cannot see why every canal boat should not be taxed. We cannot see why every bicycle should not be taxed. We cannot see why every street car should not be taxed. We cannot see why the telephone, the telegraph, the wireless and every letter should not be taxed.

**M**OTOR TRUCKS are today as essential in the war zone as guns and telephones and wireless. It is impossible to understand why a committee of business men representing a great country engaged in war should fail to see the gross injustice of placing such discriminatory taxation as the present 3 per cent tax is on motor trucks in particular.

**T**ODAY motor trucks are recommended as means of economy. In London the government has seen fit to commandeer great fleets of trucks and use them for transportation in the London zone, thereby relieving the railway service and making it possible to care for the transportation of the nation. Plans already

have been under way in the United States for some time to accomplish similar work.

**T**HE motor truck is as great a necessity today as the railroad. It is as great a necessity today as the ocean freighter, it is as great a necessity as the interurban trolley, it is as great a necessity as any horse vehicle.

**W**HAT is still more unfortunate, several of these congressmen and senators admit it is discriminatory, but they hide behind the fact that it is a war measure and that revenue must be raised. Unfortunately, some of the members of the Conference Committee are not sufficiently in step with the development of this nation to know that the motor truck is a necessity; they still believe it is a luxury. Unfortunately, they are not sufficiently in step with modern progress to understand that a great majority of the motor cars are a necessity.

**T**HESE men do not understand that the farmer looks upon his car as an investment and not a luxury. These farmers tell of leaving their farms in the early morning with six or eight bags of grain and other farm products, making a 10-mile trip to town, and being back at 10 o'clock. It used to take them an entire day. These are the modern farmers. These are the efficient farmers. These are the business farmers. These are the farmers whom we are going to rely on most during the present war. They are those who will give us most grain per acre.

**W**HY make these farmers pay for their efficiency? For their better business judgment? For their progressiveness? For their keeping in step with a newer industrial life of this age?

**I**T is to be hoped that these farmers, at our next election, will be more discriminatory concerning the men they vote for, and particularly those who have had to do with not only framing but insisting on this discriminatory war tax which they admit as such, but which apparently has been advanced instead of a Federal license tax on all cars, on the ground that the "dear voter" might object to a tax on the car he uses at present. These are times when the "dear voter" should look business straight in the face and should analyze it in the light of present developments and should go to the polls with a clearer conception of the kind of man needed in Washington in war days.

### Abusing the Spotlight

**S**TATE and city legislation against the use of the spotlight has been chiefly the fault of motorists who used it carelessly. The windshield searchlight which can be tipped at any angle and thus throw the light only on the road, and at the same time, hide the full view of the face of the searchlight from approaching motorists, can be made to fulfill practically all the requirements of a driving light without blinding other drivers.

**T**HE chief objection to the spotlight has been that drivers have not taken full advantage of the fact that it can be directed at any angle, but have permitted it to point straight ahead down the road and thus blind approaching drivers as seriously as would any undimmed headlight, when it could

easily have been tilted to a point immediately in front of the car or to the side of the road until the approaching vehicle was past. The spotlight is meant to be tilted, when necessary, and the courtesy of the road demands that consideration for other drivers. For country road work where there are no approaching vehicles, the spotlight is particularly valuable, because even when the headlights are used, the light of the searchlight on the windshield is projected further and more clearly defines that part of the road on which it is thrown. Of course, its value for reading street and road signs, etc., is beyond question. Unless drivers use the tilting qualities of their windshield spotlights, there will be more widespread legislation against them, and motorists as a whole will be deprived of a most useful illumination.

# Conservation of Man Power

## One Truck Displaces Fourteen Horses and Six Men in Pittsburgh Coal District

**P**ERFECTION of labor-saving devices has been the key to American commercial life. If we still were doing things as we did a half century ago, business could not possibly be what it is to-day. Every labor-saving device releases men for the operation of other machines. Now comes a time when we must release men for the business of war. We need these men to operate our fighting machines as we never needed them for other purposes. Still our factories, our shops and our farms must maintain a pace not hitherto reached, but with a smaller force of men, hence the need for conserving man power.

### Hauling Coal

For several weeks we have told of this need. We have asked motor truck makers, large users of trucks and cars, and others for their experience in increasing the efficiency of men, or the conserving of their working power.

Persuant to our inquiries we find that the Glass Run Coal Co., Hayes, Pa., center of the Pittsburgh coal mining district, operates a fleet of Acme trucks. One of these trucks, a 3½-ton, equipped with a

dump body, hauls coal from the mine to a brick yard 2 miles distant where 800 to 900 tons of coal are consumed daily. The truck makes an average of fourteen trips, carrying a total of 53 tons and covering a total of 60 miles.

Since a team would average but three trips a day, carrying a load of 3 tons each trip, it would require seven teams with seven drivers to do the work this one truck is doing. Thus this truck actually displaces fourteen horses and releases six men for other work. The average cost of this operation is \$6 a day.

Last week we told that it requires 5 acres of tillable land to support a horse, so in this operation it may be said that 70 acres of land are released for growing food for our armies.

There is a difference of opinion as to the use of motor cars by salesmen as an efficiency builder, but almost all of this difference rests with the salesman. Those who have energy and choose to use it to the advantage of both themselves and their employer, can do much more work and increase their sphere of activity. There are

some drones, however, who look upon the motor car as a means of lightening their day's work. It is such salesmen as these that give rise to the difference of opinion as to the real value of the motor car in building sales efficiency.

For example, the general manager of the Sharples Separator Co., Chicago, writes *MOTOR AGE* that "fifty per cent of our salesmen use motor cars of various kinds, principally of the lighter class, however. Our experience with this means of transportation is that the salesman's efficiency is greatly increased in some instances and in other instances greatly diminished by the use of a car. It depends entirely on the salesman plus the territory to be covered whether the car is a profitable investment or not."

### Covers More Territory

This but proves our assertion that a salesman with a car can cover more territory and increase his value to his concern either by working his territory more intensively or by covering the field that previously required two or three men. It is conservation either way you look at it.

## 3 Per Cent Tax on Cars

(Concluded from page 11)

much as were the practice of throwing in tires and spotlights indulged in promiscuously.

Inasmuch as the tax eventually must come from the buying public, the dealers seemed to think that this is where the tax should be placed in the first place and that no effort to place it on the manufacturer, dealer, distributor or bury it as an extra would be successful.

Dealers in cars of the higher-price class do not seem particularly alarmed over the effect of the tax. They state that a prospect desiring to buy cars in this class will not allow the small additional amount to influence his purchase. Past price increases have eliminated from the higher-priced field all those possible purchasers that would be prevented from buying by the difference in price.

However, in the popular-priced class field, the dealers are not so optimistic as to the effect of the tax. It seemed to be the opinion of many dealers that the prospect desiring a car selling up to \$1,000 would see the tax instead of the price of the car—that is, the tax would look larger to them than the car cost, and many stated that the farmer would be more averse to buying because of the tax than would the city dweller. The latter has become used to price increases and does not consider them in the same light as does the farmer.

Recent price increases in the low-price field, combined with the fact that other price increases are impending, also tend to make the outlook in this field poor, according to many dealers.

As a whole, the majority of the dealers seem to have a few cars in stock, though one dealer was an exception to this, and stated that he would take all the cars he could get, in spite of price increases or taxes. This dealer stated that the main thing needed was confidence in the market. That if prices were high now, they would doubtless be higher later, and that he intended to cash in while it was possible. For, he said, the business was there, and he was going to get it.

This dealer seems to have summed the situation up right. Though the tax, no matter how it is handled, will tend to slow the business up in the popular-price field, at least, the public will still continue to buy cars. The main thing is to realize that this tax is a war necessity, to have confidence in the motor car industry and to work a little harder to break down any increase in sales resistance that may result from the tax.

Used car dealers believe that the tax will have the effect of increasing the used car business throughout the country and at the same time of increasing the prices of used cars which are always regulated by the retail cost of new cars.

### STEWART-WARNER EARNINGS

Chicago, Sept. 28—Earnings of the Stewart-Warner Speedometer Corp. for the year ending Dec. 31, next, are expected to equal at least 20 per cent on the common stock after allowing for excess profits tax, or practically 40 per cent of the current

market price. Since Jan. 1, 1917, this company has paid off \$100,000 of notes and probably will pay a similar amount soon, thereby reducing the notes payable to \$600,000.

### FULTON TRUCK UP \$130

New York, Sept. 28—The Fulton Motor Truck Co. has increased its prices \$130, which makes the new price \$1,520.

### FORDS ARE \$5 MORE

Detroit, Sept. 28—The Ford Motor Co. has increased the price of Ford cars \$5, making an additional charge of \$5 on all cars for delivery. The increase has been made to the dealers, who in turn add it to the selling price for the customers.

### NEW JORDAN PRICES

Cleveland, Ohio, Oct. 1—The Jordan Motor Car Co. has announced a new price schedule, effective today, as follows:

7-passenger touring.....	\$1,995
4-passenger sport .....	1,995
Roadster .....	1,995
Sport limousine .....	3,300
Town car .....	3,100
Brougham .....	2,900
Sedan .....	2,650

Five wire wheels will be furnished for any model at \$100 additional. The four-passenger sport model will be provided with a special gear ratio and 32 by 4 wheels, 33 by 4½ tires optional.



## War Roads Are Agitated

Highway Men of Six States and  
Engineers Meet at  
Detroit

115-Mile Trip to Show Military  
Value of Dixie

CHICAGO, Oct. 1—Agitation for roads to aid in war work has become more general with the mobilization of the various cantonments and training camps. Representatives of six state highway departments, as well as district engineers from the office of Director of Public Roads, Logan F. Page and the U. S. Army Engineer Corps, attended a war meeting to consider auxiliary shipping measures held by the Detroit Board of Commerce last week. A comprehensive plan of assembling supplies at important business centers was outlined, and routes over which such products could travel by motor trucks were discussed. The Detroit-Toledo road was condemned for unfitness, and steps planned to make it a permanently good road for the transportation of trucks to carry Liberty engines, shell and other supplies which the two cities are contributing to war preparations.

The states represented were Indiana, Ohio, Michigan, Pennsylvania, New York and Virginia.

### To Demonstrate Value

A demonstration of the value of a system of military highways connecting the supply bases with the military cantonments will be made Oct. 11, when six 2-ton motor trucks loaded with Government supplies for the post quartermaster at Fort Oglethorpe, Ga., will leave the warehouse of the depot quartermaster at Atlanta, Ga., for the 115-mile trip over the Dixie highway. At the same time a test in the transportation of soldiers will be made. A special truck, built according to specifications of Major-General Leonard Wood, will transport sixteen soldiers from Fort McPherson to Fort Oglethorpe, with their guns, ammunition and full marching equipment.

Major R. B. Powers, post quartermaster at Atlanta, assisted by Captain A. T. Dalton, post quartermaster at Fort Oglethorpe, will prepare data as to the time required and the cost of a similar shipment by rail. Official observers will compile data as to time required in loading, transporting and unloading, road conditions, gasoline, oil, etc. The Dixie Highway Association, the Georgia State Automobile Association and the Chattanooga and Atlantic Automobile Clubs are co-operating in holding the tests. The trucks and escorting cars will be divided equally between two routes.

Under good weather conditions it is expected that from 12 to 24 hr. will be cut off the train time required for the shipments. The Secretary of War and Major-General Wood are urging the citizens of the different counties through which the organized highways run to render military service through building the important links. Even if the highway prove for com-

mercial purposes only the service to the Nation in providing these roads is just as valuable, as it relieves freight cars for the longer hauls and enables business otherwise forced to suspend on account of freight car shortage to continue as near normal as possible.

The dedication of the road called the Outer Belt Drive in Wayne County and surrounding Detroit will be celebrated by the Detroit Automobile Club and many motor car manufacturers. There will be at least 1000 motor cars in a parade which will be held Oct. 11 and bands from the Ford, Willys-Overland, Maxwell, Reo, Chalmers and Packard motor companies will form a part of the assemblage. Governors from several states together with Governor Sleeper of Michigan and state highway commissioners from the Middle West will drive in the parade.

### COURT FOR CAR THIEVES

Chicago, Oct. 2—A centralized court for handling car theft cases may be organized in Chicago if the wholesale thievery of motor cars does not cease. This plan was advanced recently by MOTOR AGE as a means of bringing car thieves to justice, and Chief Justice Olsen is now giving consideration to this plan. The chief justice of the municipal court has the power to create such a tribunal and has indicated his willingness to do so if the prosecuting authorities, the police, the motor car insurance men and the car owners believe such a special court would help to check thefts.

Chicago has long had a speeder's court to which all offenders are brought to appear before the same judge. In this way speeders or violators of other sections of the traffic laws, if chronic offenders, soon become known and are dealt with accordingly. It is believed a similar court would weed out car thieves.

### TEN ENTRIES FOR CHICAGO

Chicago, Oct. 2—The Chicago Speedway has signed up ten entries for Oct. 13. Negotiations are under way to get Ralph de Palma here if possible. Originally it was planned to run four races—20, 30, 50, and 100, but as the race is to start at 3 o'clock and as it gets dark so early, it is probable that the 50-mile event will be eliminated. The entrants to-date are:

CAR	DRIVER
Frontenac .....	Mulford
Frontenac .....	G. Chevrolet
Frontenac .....	Boyer
Duesenberg .....	Milton
Duesenberg .....	Henderson
Pan-American .....	Alley
Miller Special .....	Gil Anderson
Delage .....	Ford
Ogren .....	Mason
Hoskins .....	Lewis

### SIXTEEN VALVE STUTZ ONLY

Indianapolis, Ind., Oct. 2—Special telegram—The Stutz Motor Car Co., will concentrate on a sixteen-valve 4½ by 6-in. engine which will be used on four new models this coming season. The company is manufacturing only four-cylinder cars with T-head engines, the eight-valve engine offered optionally last year being dropped. The four models are: Bearcat, on a 120-in. wheelbase at \$2,550; roadster, \$2,550, formerly \$2,375; four-passenger, \$2,650, an increase of \$100, and the six-passenger \$2,750 instead of \$2,550.

## Cheaper Cars Unlikely

Fixing of Steel Prices May Not  
Affect Motor Industry as  
a Whole

Other Costs and Present Contracts  
Are Cited

CHICAGO, Oct. 1—The fixing of prices for steel and the establishment of classifications of users is not likely to affect the motor car industry to any great extent, according to A. I. Findley, editor of *The Iron Age* and one of the best informed men in the steel trade. This is directly in line with the consensus gained from a more general survey of the industry than could be made before going to press in the last issue of MOTOR AGE. In a symposium conducted by the *Chicago Tribune* yesterday the presidents of Packard, Nash, Nordyke & Marmon, Jordan and Maxwell are quoted to the effect that if the steel cut does affect the production of motor cars there is little hope for cheaper cars.

Any lowering of the price of the motor car would not be effective for at least six months, according to Alvan Macauley of Packard. The fixing of prices on steel will have no bearing whatever on the price of motor cars, according to C. W. Nash. Eventually the matter of steel prices may have some influence but not in the immediate future, according to F. E. Moskovies of Nordyke & Marmon. The big cost items contributing to increased prices are transportation and labor, and the reduced price of steel will not affect motor cars for several months, and then will not offset the increased cost of production due to reduced output, according to Edward S. Jordan. The mills are too crowded to produce at new rates for months to come, according to Walter E. Flanders of Maxwell.

### Price Probably Scheduled

So far as price is concerned, Mr. Findley says, the motor car companies probably have prices scheduled in existing contracts and these generally will prevail, the new fixed prices coming into effect on new contracts.

As regards the A, B and C classifications, he stated that the motor car industry would not feel any great change because the listing of these classifications is only the reduction to systematized form of the procedure that has been followed for some months. The government always has come first and those who needed steel most have had the call. The new classifications serve mostly to systematize and standardize what has been done more or less informally for some time.

The Government's biggest demand is for plates, and some sheets and bars, while the motor car industry's biggest demand is for bars, Mr. Findley stated. The demands, therefore, are not the same, which should prevent a heavy blow falling upon the car industry. Mr. Findley says that trucks for war use will probably be given some sort of war classification but he would not venture to classify cars generally. So far as the output of steel is concerned the demand



has been in excess of the supply for some time.

Within a reasonable time, it is stated at Washington, the entire steel trade is to be placed under Government control as regards prices. This action will come, regardless of the fate of the Pomerene bill now before the Senate, which provides Government control of iron and steel products. The difference, in the event the Pomerene bill should become law, would be that the Government would have specific authority to name the maximum price for every article in the iron and steel trade.

#### MAXWELL NETS \$5,368,546

Detroit, Oct. 2—Special telegram—The annual report of the Maxwell Motor Co. shows net profits for the fiscal year ended July 31, 1917, of \$5,368,546, compared with \$5,088,994 last year. Earnings are equal to 29.63 per cent on the \$12,778,057 common stock after allowing for dividend requirements of 7 per cent on the first preferred and of 6 per cent on the second preferred, against 27.53 per cent earned in the preceding fiscal year. Net earnings amounted to \$5,342,728, against \$5,531,034 in the preceding year. The net income amounted to \$5,507,697 after deducting a corporation income tax of 2 per cent.

#### HUDSON MEN FORM ESSEX

Detroit, Sept. 28—Members of the Hudson Motor Car Co. are forming a new company to be known as the Essex Motors Co., which will have a paid capital of \$500,000 and will bring out a new model which members of the company think is demanded by new conditions. The new car will not conflict with the Hudson models and the new company will have no direct connection with the Hudson Motor Car Co. Officers of the new company are W. J. McAneney, factory superintendent of Hudson, president; R. B. Jackson, secretary and treasurer of Hudson, vice president; A. Barit, purchasing agent of Hudson, treasurer; J. L. Vette, secretary. In addition to these the board of directors will include Roy D. Chapin, president of Hudson, O. H. McCormack, sales manager of Hudson, and F. O. Bezner, vice-president.

#### RESTRAINED FROM FIXING PRICE

Cincinnati, Ohio, Sept. 25—The Ford Motor Co. was restrained from setting a price by which Ford cars are to be retailed when the United States Circuit court of appeals yesterday filed a mandate and opinion in the appeal of the Ford Motor Co. versus the Union Motor Sales Co. et al., Dayton, Ohio, in the United States District court, in which the court affirmed the decree of the United States district court. Judge Hollister dismissed the Ford company's suit against the Union company in which the Ford sought to restrain the Union company from selling Ford cars at prices below the standard fixed by the company.

This suit, which was started in 1912 and which at that time attracted considerable attention, involved a basis of price cutting. The Union Motor Sales Co., a co-operative organization in which customers are stockholders, taking a \$10 share of stock and sharing in the benefits of the


company, advertised Ford cars at less than regular prices. Ford declined to sell this company cars and in the suit which was brought about in 1912 charged that the Union Motor Sales Co. had conspired to obtain cars from regular Ford dealers which cars were sold at less than list; the suit asked \$50,000 damages and an injunction restraining the Union company from selling any more Fords. A preliminary injunction was granted July 1, 1912. A year later Ford charged L. A. Howard and O. D. Noble with contempt of court for continuing the forbidden practices; the charge was sustained in court but in 1914 following numerous high court opinions on price maintenance Judge Hollister dismissed the Ford suit in its entirety.

In the trial of the action it was proven that the Union company had secured Fords and sold them to stock members at from 10 per cent to 15 per cent less than list. The Ford contracts, however, were declared invalid by Judge Hollister in an

opinion covering fourteen typewritten pages and in which he declared that the licensed contracts used at that time were not of a form approved by the United States Supreme Court. In addition to the Union Motor Sales Co. the defendants include L. A. Howard, J. C. Horton, E. S. Sorsley and W. T. S. Yokum, all of Dayton, Ohio.

#### MAXWELL LOSES CASE

New York, Sept. 28—The Maxwell Motor Sales Co. will have to pay about \$35,000 a month damages to H. Ward Leonard, Inc., according to a decision of Judge Hough in the United States District Court, who declined to modify a previous decree enjoining Maxwell from further infringements of patent granted to Harry Ward Leonard and covering a lighting system. The first patent, No. 1,157,011, was dated Oct. 19, 1915, and the second, No. 1,122,774, Dec. 29, 1914. Sept. 17 the court entered an order suspending the injunction



## LINES TO RICK

By John D. Terns  
(Eddie Rickenbacker recently has joined the aviation corps with Pershing in France)

To the throb, throb, throb of an engine's heart,  
And the whir of the hurried wheels,  
You have dared and vied while the Fates yawned wide,  
And you know how the tight fit feels.

Oh, a smug Death lurked out at Sheepshead Bay,  
And a Death at Tacoma track;  
How the Fates must doubt when a brave fares out  
And the better for fame comes back!

There's a fairer claim for the strong,  
In a game where we need you more;  
There's a nobler niche and you've found it, Rick,  
In the Aviation Corps.

To the beat, beat, beat of your engine's heart,  
Add the cheers of the fans you knew;  
For we know your worth, and so will the Earth,  
When the Huns of the air meet you!

and accounting upon condition that Maxwell file a bond for \$5,000 and a monthly statement of all cars and apparatus embodying the inventions of the patents shipped or delivered by it subsequent to the decree and until the issuance of the mandate of the Circuit Court of Appeals, and in the event of the affirmation of the decree to pay to the Ward Leonard interests \$5 for each apparatus shipped during the period of suspension. Maxwell then moved the court to modify the order by relieving it from the requirement to pay \$5 for each apparatus.

An affidavit states that Maxwell is handling at least 7000 cars a month and that at least two months would be required before another system safely could be put in production.

#### PARTHFINDER MEETS TROUBLE

Indianapolis, Ind., Sept. 29—A receiver has been appointed for the Pathfinder Motor Co. of America which recently succeeded the Pathfinder Motor Co. of this city. Judge A. B. Anderson of the Federal court has appointed Charles Martindale, an Indianapolis attorney, as receiver.

The appointment was asked by creditors who also filed a petition of involuntary bankruptcy against the company. The creditors bringing the action were the Landers Brothers Co., Toledo, Ohio, the Metal Auto Parts Co., Indianapolis, and the Central Plating & Mfg. Co., Indianapolis. The listed claims of the three concerns exceed \$10,000.

The bankruptcy petition alleges that the company is insolvent and that its liabilities exceed \$100,000. The company is charged with showing a preference for certain creditors during the last four months.

The action in Federal court followed closely a similar action in the Marion Superior Court of this city, when in answer to a petition for the appointment of a receiver, the court named the Union Trust Co. of Indianapolis as receiver. The action in Federal court takes precedence over that in the local court.

#### RECEIVER FOR SHOTWELL PUMP

Indianapolis, Ind., Sept. 29—A receiver has been appointed for the Shotwell Pump & Tank Co., which is manufacturer of gasoline tanks and pumps in this city, James M. Ogden, an attorney, being named receiver. The action followed the filing of an involuntary petition in bankruptcy against the company by the Edward Mason Co., Indianapolis, which alleges that the plaintiff is insolvent. The Edward Mason Co. claimed that the Shotwell company owes it \$13,940 in unpaid bills. Lax business methods are charged in handling the business affairs of the company.

#### PLANT FOR MASTER PRIMER

Detroit, Sept. 28—E. T. Daniels, secretary of the Master Carburetor Corp., is incorporating a new concern which has purchased the patents covering the primer which the Master company has been marketing and which already has been adopted by the Franklin Automobile Co. as standard equipment. The company will organize and erect a factory in Detroit.

## Car Sales Show Gain More Expensive Models Share with Low-Priced in Greater Demand

### Traffic Conditions Begin to Worry Industry

**D**ETROIT, Oct. 1—Manufacturers of cars selling for more than \$1,500 are noticing a slight improvement in the sales of open cars and are enjoying fairly good business in closed cars. This report received from several companies coincides with reports by a large body manufacturer and bearing maker both of whom stated that orders were increasing within the last ten days from makers of cars above the popular prices. They also report an excellent condition of business among large companies making cars selling at popular prices.

The Fisher Body Corp., now producing about 900 bodies daily, states that although business from the more expensive car makers decreased noticeably in the last ninety days, it is picking up rapidly now and particularly so in the closed body division. The company also reports that its customers selling cars at \$400 to \$1,200 are doing a record-breaking business.

Conditions reported from various sections of the country point to a continuation of the demand with the only cloud on the horizon being the tax now contemplated by Congress and which makers and dealers believe will have a slight tendency in certain regions to slow down sales.

The business received last week is re-

*Lee Miles, president of the Southern Motors Co., Louisville, Ky., has evolved a plan he believes will help solve the nation's transportation problems. At the factory, after the final inspection, the demountable rims and tires are to be removed from the cars, flanged wheels fitted and the cars then sent to their destination under their own power in trains of from twenty-five to fifty over the railroad rights-of-way. This is the way an artist in the Louisville Times pictures it if Mr. Miles' dream comes true*

ported by most concerns to be distributed equally throughout the country, while a few report it as spotty and state that the eastern section is beginning to make a larger demand for cars. The Anderson Electric Car Co. reports an increase of business for export with an unusual demand from Japan to which country the company shipped nine cars last week.

Traffic conditions are becoming a general topic and several companies are now sending officials through the country to learn the best ways to overcome the problems and to confer and advise with distributors and dealers. Large distributors in this territory are advising dealers to drive their cars to their cities when they are within a radius of 200 miles, thus allowing considerably more freight cars for the manufacturers.

#### U. S. REFUSES FORD PLANT

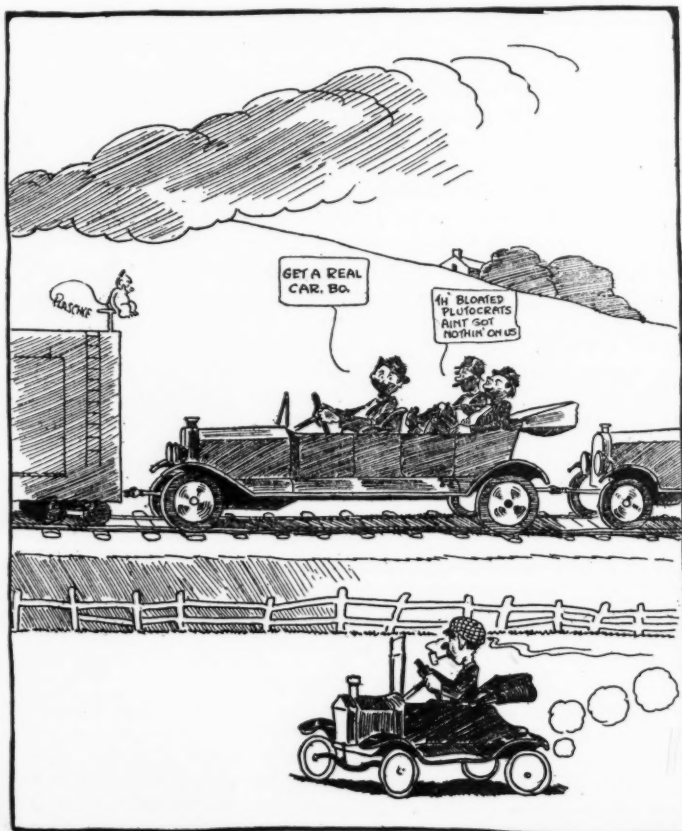
Detroit, Sept. 28—The War Department has decided not to accept the Ford factory and assembling plant at Cambridge, Mass., for use as a quartermaster's depot because it would throw too many employees out of work.

#### \$15,000,000 ORDER FOR PREMIER

Indianapolis, Ind., Oct. 1—Special telegram—The Premier Motor Corp. has received a Government contract for \$15,000,000 worth of four-wheel-drive trucks. These are to be built under license from Four-Wheel-Drive Co., Clintonville, Wis.

#### CROSSING JOGS BRING ACCIDENTS

St. Louis, Mo., Oct. 1—The appointment of C. M. Talbert, director of streets and sewers of St. Louis, as chairman of the public safety committee of the National Safety Committee was a recognition





# What War Will Mean to the United States

LORD NORTHCLIFFE, head of the British Mission in America and who, in that position, superintends the purchases of \$50,000,000 to \$60,000,000 per week of war supplies for Europe, gave some interesting ideas at the war convention of business men in Atlantic City, N. J., a week ago as to what war will mean to America. England, although but 2 miles across the channel from France, already has built many cities the size of Bridgeport, Conn., which has a population of 200,000, back of the British lines in France. These cities are great repairing and manufacturing cities. All the rifles of the British army have to be gone over every week or so to be kept in first class condition. This work is done in these newly built British cities back of the line. The machine guns have to be similarly cared for; so have the eighteen pounders which are 3 in. guns that correspond with the French 75 mm. rapid fire guns; so have the large siege guns which are mounted on railroad tracks; so have the trench mortars; so have the aviation engines of the British flyers; so have a million or more pieces of machinery used by the British armies in this great war in which machinery and business are combined. Great Britain cannot afford to transport these machines across the British channel and repair them in her own factories. Such transportation would be too costly and consume too much time. To meet the condition she has built these great cities back of her lines in France. She has built railroads to these cities and other railroads from these cities up to the front. She has built modern roads for the motor trucks. She has built electric lighting systems and established complete lighting systems. She has built sewer systems; she has built telephone systems; she has built shoe factories, refrigeration plants, hat factories, cap factories, woolen factories and scores of others. She has built everything that goes with a large city.

What Great Britain has had to do back of the lines in France, America will have to do. We will have to build our manufacturing cities to care for our great army and its tremendous equipment. We will have to erect great office buildings to handle the clerical work of the army and perhaps tens of thousands of women clerks will be necessary to do this work. It is stated that England has tens of thousands of women in France handling the entire clerical work connected with a great army.

Think for a moment what it means to keep the clothing for 1,000,000 or 2,000,000 soldiers in condition. They have their

summer clothing, their winter clothing, their wet weather clothing, their boots for different conditions; their gas masks, and a dozen other forms of clothing. Great factories and thousands of workers are needed for this task alone. This must be cared for in the cities we will build back of the lines.

Lord Northcliffe told of many of the practical things that England did after entering the war. The first was to add an hour of daylight to each working day by starting that much earlier in the morning. This has worked entirely satisfactorily, and America may be doing it next year. England found it poor policy to work men seven days a week. They tired. Starting an hour earlier each day developed a spirit of thrift in the nation, thrift in saving food, thrift in conserving labor, thrift in spending earnings, and general thrift. Already many steps of progress have come as a result of the war. Medical surgery has made wonderful progress. There has been amazing progress in dentistry. Sanitation has progressed more than in two decades of peace.

In England and France practically all industries are war industries. In fact there is scarcely an industry in either country that cannot be so classified. Furniture makers have left their furniture occupations and now are making the delicate, yet strong, framework for the planes of the airplane. Workers in motor car factories now are manufacturing engines for airplanes, farm tractors, guns or munitions. At one point in England, where before the war there was a straggling village of twenty houses, there is now a huge munition city measuring 9 miles in length and 3 miles in width. So great has the production of munitions multiplied in England since the start of the war that in every three days they now are manufacturing more small round ammunition than they made in the first year of the war. In every four days they now are manufacturing more large size ammunition than was made in the first year of the war. In every five days they now are manufacturing more machine guns than they made in the first year of the war. In every six days they now are manufacturing more large field guns than they made in the first year of the war. Great Britain has moved 8,000,000 men across the British channel to France without losing a single soldier. She has moved 10,000,000 tons of munitions without losing a single cartridge. In addition to carrying on her own shipping she has loaned 600 merchant ships to France and 400 to Italy.

tion of Mr. Talbert's method of reducing accidents in St. Louis. The method, as Mr. Talbert tells of it, was this:

"When the outcry against many street accidents came, it occurred to some of us that the police and the street railways had been tabulating accident reports for some years and that we might learn something from a study of those reports. We plotted these reports with colored tacks on a map and soon had the accident corners designated.

"Then we looked for the causes. Here it was an abrupt turn; sometimes too little

light; slippery paving; too little policing; peculiar topography. Very often, heavy traffic was to blame."

Mr. Talbert tells how these causes were corrected by placing additional lights on some corners, by buying additional land to permit eliminating a jog in crossings and by treatment of subsurface to correct paving. Each corner was made a special problem and by comparison with other corners nearby with heavier or equal traffic, it did not take long to ascertain the causes. In half a dozen cases, a few lights have done the work but at other corners it has taken

a traffic policeman. In some places it has been necessary to turn traffic from narrow street leading to busy corners. Jogs in streets at crossings are most difficult to remedy.

## CONTINENTAL U. S. TRUCK ENGINE

Muskegon, Mich., Sept. 19—The Muskegon plant of the Continental Motors Corp. will soon be manufacturing two sizes of truck engines, designed at Muskegon and in accordance with the standardized government specifications, for transport service trucks for the United States army.

# Severe Tractor Test at Toronto

Government Furnishes  
at Fixed Charge

Tractors to Farmers  
Per Acre Plowed



Canadian air pilots surveyed the plowing demonstrations in Ontario

UNDER the auspices of the Department of Agriculture of the Province of Ontario a three-days' motor plowing demonstration and exhibition of modern farming machinery and implements was successfully concluded at Toronto on Sept. 21. It was the third annual event of the kind and was managed for the National Tractor Association by P. G. Van Vleet of Toronto. The demonstrations took place on the Toronto Industrial farm located at Richmond Hill, 12 miles north of the city. This farm comprises about 1000 acres of practically level land and is said to be one of the best farms in the province. All of this land with the exception of a small part planted to beets, was available for plowing. Some of it was in stubble while other sections had been in sod which had been turned some months ago.

This is the only power plowing demonstration besides that at Fremont, Neb., which is approved by the National Association of Tractor Manufacturers and is intended to popularize the tractor among the farmers not only of the Province of Canada but of the whole eastern part of the North American continent. The large numbers of U. S. flags worn indicated that there was a very considerable representation of visitors from below the border line.

Comparing the demonstration with that at Fremont, it was held under the same conditions and therefore was subject to some of the same criticism that was passed on the latter event. Absolutely no attempt was made to check the amount of work done by the different tractors, the time it was done in and the amount and value of the fuel consumed. Everybody has to judge the performance of the different machines for himself. There was, however, this difference between the two demonstrations, that whereas Fremont has a soft loamy soil which turns quite easily the soil of the Industrial farm at Toronto is naturally quite heavy and in addition a protracted dry spell had preceded the demonstration so that the soil was exceedingly hard and difficult to plow. Even in the case of the deepest plowing there was absolutely no trace of moisture. It is said that tractor manufacturers favor Fremont, Neb., for demonstrations, on account of its light soil, they can make a very impressive showing. Richmond Hill, Ont., on the other hand does not give much opportunity for performances that look impressive in print, but it permits of rather severe tests of the tractors. As a result

some cases where the plowing was unsatisfactory it was difficult to say whether the fault was chiefly with the plow or the tractor. Also some of the plowmen seemed to take their task more seriously than others, some plowing continuously for hours entirely unmindful of the crowds watching their work while others fussed around a good deal and spent much time explaining their machines or discussing the subject of power farming in general.

Just at the present time there is a great deal of interest in power farming among the farmers of the Province of Ontario, owing to the scarcity of labor and the high prices paid for farm products. In order to encourage the introduction of motor tractors, a number of patriotic citizens of the Province organized the War Production Club. The latter bought five Bull tractors, which it was intended to let to farmers at fixed rates. One of these tractors was later given to the Ontario Government and four of them were let to farmers under contract at \$2 per acre, everything included, the section operated being that close to Toronto. The chief idea behind the activities of the War Production Club was to stir up the government to do



A section of the Toronto Industrial Farm where the tractor demonstration was conducted. The tents housed some of the exhibits



something along this line, and since the club succeeded in this plan it has suspended its own activities.

The government of the Province of Ontario now has 128 tractors of a great variety of makes. In the purchase of these tractors quick delivery was an important consideration and twenty-two different makes are represented in the lot. These tractors are handled by district representatives, of which there is one in every county in the Province. In case there is a call for a government tractor in any section and the district representative can see sufficient acreage in the neighborhood the government will purchase a tractor and the district representative will look after it. The farmer pays 35 cents per hour for the operator's time and also buys all fuel used in plowing, while the government pays all cost while the machine is laid up for any reason and also the cost of labor and fuel while the tractor is being taken from one place to another. The man chiefly responsible for this scheme is C. F. Bailey, Deputy Minister of Agriculture of Ontario. It is said to have been a great help to the farmers of Ontario, for the reason that the season was so backward, and many thousands of acres were plowed which otherwise would have remained uncultivated.

#### To Form Tractor School

A plan is also on foot for the establishment of a tractor school at the Ontario Agricultural College located at Guelph, which is claimed to be one of the best agricultural colleges in North America. At this school it is intended to educate or train men to operate the tractors purchased by the government and also to give farmers an opportunity to familiarize themselves with the operation of tractors.

Weather conditions at the demonstration were almost ideal, the only untoward incident being a slight shower on the second day, which was the main day of the event. The attendance was very satisfactory, many farmers coming to the demonstrations in their motor cars from far away points. On the first day there were about 300 cars parked on the demonstration grounds, on the second day about 400 and on the last day slightly more than 200. A charge of 25 cents was made for parking cars.

In addition to tractors, plows and other farm implements were exhibited. These exhibits were housed in tents. In the main tent where the headquarters of the management were located, there were also a number of exhibits of automotive accessories and engines. This was surrounded by smaller tents, the whole being arranged in a square. The land in this part of Canada is slightly rolling and the tent colony was located on an elevation so that it could be seen from far off. With men from the Camp Borden aviation training grounds, nearby, flying overhead, hundreds of cars parked on the grounds and scores of motor tractors busily engaged in turning the soil, the scene was one that will not soon be forgotten by those whose interests are associated with the automotive industries.

Owing to the transportation difficulties some of the firms which had entered tractors were prevented from taking part in the demonstrations. Thus the Gray Trac-

tor Co.'s machine got sidetracked in Chicago and the Parrett Tractor Co. of Chicago and the Hart-Parr Co. of Charles City, Ia., who figured in the list of exhibitors were not represented.

Canada is evidently developing a tractor industry of her own, about half a dozen tractors of Canada manufacture taking part in the demonstrations, though the engines and some other components in most cases were of U. S. manufacture. The smallest tractor built in Canada that was exhibited was the Essex 6-12. This has a four-cylinder Continental 3¾ by 5 in. engine with magneto ignition and a governor. A cooling tank is used instead of a radiator, the advantage claimed being greater reliability. Of course, from the standpoint of cost the tank also has the advantage. The Essex is a four-wheel tractor with the engine over the rear axle, the cooling tank over the front axle and the transmission gear in between. The drive to the 40 in. driving wheels is by chain. Two speeds forward are provided as well as a reverse. The transmission gear is of the type in wheel, all gears remain constantly in mesh. The Essex has a 60-in. base and can turn in an 8-ft. circle. A 15-in. belt pulley of 6-in. face is mounted on a crossshaft about midway between the front and rear wheels and is controlled by the engine clutch, which is of the conical type.

Regarding the cooling system it may be said that the cooling tank gave off a great deal of steam after the tractor had hauled a plow for some time. This is apt to be interpreted as showing that the engine is overheated, which is usually the case when a radiator steams in a similar manner. However, the tank cooler has little chance of disposing of heat except by evaporation, but as long as there is enough water in the tank the engine will not overheat. The Essex people sold their demonstrating tractor at the exhibition to a farmer residing not far from Toronto, and delivered it to him at once.

Three different makes of creeper type tractors were represented, viz., the Cleveland, the Neverslip made at Watertown, Wis., and the Decker, a Canadian made machine. The Neverslip track laying mechanism is quite similar to that of the Cleveland. This machine has a frame on which are journaled two axles carrying the sprocket wheels to which the track laying chain is fitted. There are two pairs of carrying wheels journaled on the same frame, which run on the chain track. All of the weight of the tractor is available for traction purposes and as it is distributed over a large surface on the ground the soil is not packed so tight. This tractor is made in several different sizes. The largest sizes, rated at 50-80 hp. are of different construction from the smaller ones, in having a pair of front steering wheels in addition to the creeper mechanism.

The Decker tractor, made by the McDonald Thresher Co., Ltd., Stratford, Ont., has separate front steering wheels and a rear creeper construction. A four-cylinder engine is fitted and friction disk and wheel transmission is employed. The differential gears are inclosed and run in oil. Covering the unit pressure on the ground the manufacturers give the following figures: The

chain or creeper track is 36 in. long between centers and 8 in. wide, which gives an area of 288 sq. in. With a total weight of about 2900 lb. on the two creepers this figures out to about 5 lb. per square inch.

Another Canadian tractor taking part in the demonstrations was the Sawyer-Massey, made by the Sawyer Massey, Ltd., Hamilton, Ont. This is made in two sizes rated at 12-22 and 27-50 hp. respectively. These tractors both have the four-cylinder engine over the rear axle, the radiator in front and the transmission gearing, fuel tanks and other parts in between. With this arrangement of the component parts the drive of the fan is somewhat awkward. The cylinder dimensions of the small engine are 4 by 6 and the engine operates at 700-1000 r.p.m. This tractor has 54 by 14 in. rear wheels and 28 by 5 in. front wheels. A 21 by 8 in. belt pulley is provided and turns at one-half crankshaft speed. This tractor weighs 5200 lb. and has a capacity of three to four plows. Its two forward speeds are 2¼ and 3½ m.p.h.

#### Buckeye Tractor Ditcher

Considerable interest was aroused at the exhibition by a demonstration of the Buckeye traction ditcher made by the Buckeye Traction Ditcher Co., Findlay, Ohio. This machine, operated by an internal combustion engine, makes trenches for laying drain tiles. It is made in eleven different sizes to suit the dimension of the ditch required. The ditcher consists essentially of a creeper type tractor to the rear end of which is attached a digging wheel which can be raised and lowered and to which power is transmitted by a chain and pin wheel mechanism. The dirt picked up by the shovels as they pass through the ground is dropped on to a conveyor belt as the shovels reach their highest point, and the conveyor drops it to the ground at a sufficient distance from the ditch so none will run into the latter again.

Two different makes of tractors made from Ford passenger cars were on hand. Much interest was shown in these by the farmers present, on account of the low prices of the outfit. One of them afforded the further advantage that the tractor part could be quickly removed, the regular rear wheels replaced and the machine used as a runabout. These tractors, however, were hardly sufficiently powerful for the work required of them on this difficult soil, and some rather uncomplimentary remarks were made by some of the farmers present.

Very creditable work was done by a pair of Moline Universal two-wheeled tractors and a Universal Harvester Co. tractor operating at that part of the farm most removed from the exhibit. Something of a curiosity was the Turn-Drive tractor, a Canadian product. This tractor is operated from a seat on the plow by means of a pair of reins. No very definite information could be obtained regarding the control and other features but it seemed the rein control affected only the starting and stopping of the tractor. Having only two reins to handle instead of perhaps a half a dozen or more levers may appeal to the farmer, but it is doubtful whether effective control under all conditions of field work and traveling on roads can be combined in a pair of reins.

# America Plans Trade of Future

## Business Men Consider Post-War Situation One of Intense Competition and Study to Meet Conditions

ATLANTIC CITY, Sept. 28.—The consensus among business men representing 1000 chambers of commerce assembled here in war convention by the United States Chamber of Commerce is that at the end of the war America will find itself in one of the greatest periods of international trade competition ever known. Such sentiments were expressed by leaders of industry who are making a careful study of present conditions and also are studying what other nations are doing to prepare for trade when the war is over.

George E. Roberts, assistant to the president of the National City Bank, New York, told of the wonderful work Great Britain is doing to prepare for the post war trade. England will have to face a great national debt with interest charges of approximately \$1,500,000,000 per year due to the war, and it is essential that she should be bending every effort for re-establishment to take care of such a load.

Soon after Great Britain's program for handling the war was defined, she took up the work of reconstruction and already has established a cabinet position known as the Ministry of Reconstruction, and as a result the country today is seething with national activities and undertakings that will follow the war.

Although little information has leaked from Germany as to how she is preparing for post-war trade, it is known that a bill was introduced in the Reichstag to provide for the re-creation of the German merchant marine fleet for post-war conditions.

With these examples suggesting what

may be expected in foreign trade after the war, it is fundamental that if the foreign trade of the United States is to take that position which it must to preserve the status of the nation we must build up a great army of investors willing to place their money in the foreign countries with which we hope to trade.

### Must Improve Trade

John D. Ryan, president of the Anacosta Copper Co., familiarly known as the Copper King, declared the United States will have to improve greatly its foreign trade, and that we are much weaker as an exporting country than many believe and weaker than our export figures tend to show. Our export figures would give the impression that approximately 50 per cent of our exports previous to the war were manufactured products and 50 per cent raw materials. This was not the case as bar copper, for example, was classed as a manufactured product, whereas it should be classed as a raw material. After carefully revising the export figures Mr. Ryan declared that 68 per cent of our exports were raw materials and only 32 per cent finished products. Our manufactured exports averaged only \$3.50 per capita. He declared that this point is where we will have to begin after the war unless we take urgent steps at present to spread our export trade along new lines.

Edward A. Filene of William Filene Sons Co., Boston, believes that after the war business success will be the supreme need of every nation. American business will come to the end of the war with its

productive capacity enormously increased. After the war its still large surplus should make American business one of the most interested contestants in the race for world markets. If our increased productive capacity, which we must keep employed, must offer its surplus in markets made difficult by over-intense competition, the general cutting of prices is inevitable. A general lowering of prices would force American business to operate on a narrowing margin of property. This in turn will mean a tightening of the lines between labor and capital.

The problem of American business after the war is complicated by two obvious facts: Every nation will be under an equally heavy pressure to find profitable markets for its products, and war has stimulated the production of Europe to an even greater extent than it is stimulating the production of America.

Both these facts will make the nations of Europe our severe competitors in the race for world markets. Nor will the nations of Europe buy from us more than urgent necessity demands once the imperative needs of reconstruction have been met. This will be true because after the war the nations of Europe will have learned that a nation containing within its own borders all the elements needed to sustain its life and supply its army will stand the best chance of survival in the event of another war.

The future will demand that business statesmanship supplement political statesmanship.

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## To the American Citizen

A NEW ISSUE of \$3,000,000,000 worth of bonds to be known as the Second Liberty Loan is now offered to the American people. They will be issued in such denominations and on such terms that every patriotic citizen can afford to help the Government by lending his or her money on the security of a United States Government Bond.

You are an American citizen. This call for funds is to you. The man able to bear arms is called to his duty; the citizen able to buy Liberty bonds to his duty. Without money the Army cannot win. Without Liberty bonds there can be no money. And unless the Liberty loan succeeds America will have lost the war before having fired a shot on the firing line.

Success for the second Liberty loan is just as necessary as was success for the first. Every person who subscribes will be contributing not only to the material welfare that comes with safe, sound investment, but to the welfare of the Army.

Back your citizenship. Let the men who fight for you know you back them. It may be the greatest service to the country many of us will be able to render. Do not fail in your share. Be a booster—

## BUY A BOND

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# Accessory Show Sees Many Sales

Attendance at Exposition Reaches 51,039 Divided Evenly Between Chicago Residents and Visitors

CHICAGO, Oct. 1—Now that the first national accessory show for Fords is history, and after a thorough canvass of the exhibitors for information on business done, the old phrase "came, saw and conquered" seems fitting in referring to this particular angle of the show. Inasmuch as this was the initial exhibition of this kind, exhibitors were not over-enthusiastic before the doors opened, but before the seven days were completed they had written as much business as they would have had any right to expect had this been the fourth or fifth annual exposition of its kind.

Some of the high spots during the week's business were these:

The Wire Wheel Corp. of America sold 250 sets of Houk wheels the first night, closed contracts for an entire state, did \$50,000 worth of business during the week, and sold twenty-four sets of wheels outright at the show.

Simplex Mfg. Co. closed one deal for \$10,000.

## 80,000 Pumps Contracted

Auto Pedal Pump Co. closed contracts for the sale of 80,000 pumps at \$5 each.

One top manufacturer disposed of three carloads.

The Auto Remodeling Co., Chicago, sold sixty bodies and has prospects for 100 additional bodies.

Attendance figures during the seven days totaled 51,039, of which 3 per cent represented paid admissions. Fifty per cent of the attendance was out-of-town people, and the remainder Chicago people. It is estimated that of the total attendance, 25 per cent represented dealers and jobbers, and 75 per cent car owners.

Dates for next year's show have been set for Sept. 23-28, inclusive, and practically all exhibitors have signified their intention of taking space. Forty-one manufacturers that were not here this year already have agreed to exhibit next year.

The Chicago office will be closed this week and the business of the show handled by Manager H. V. Buelow from Toledo, Ohio, until March 1, when offices will be reopened here.

The class of people that visited the accessory show is declared by exhibitors to have had a greater percentage of real buyers than is usual at the national winter shows. Of course, this might be expected, since those who visit a motor show find something of common interest in the new models whether they buy or not, while

those who would visit an accessory show very likely would be interested because they were car owners.

The Bailey-Non-Stall Differential Corp., Chicago, signed up with a number of new jobbers, and did much more business than had been anticipated. This company reports the show to have been a success from its viewpoint, and while a large part of the actual business consummated was with jobbers, there were a number of retail sales, and besides much interest shown by garage and service men throughout the week. It is understood that there was a Government man investigating the differential for Government work, and during the week there were a number of visitors from several of the large motor car companies.

The Hassler Distributing Co., Chicago, closed five contracts for fifty sets of shock absorbers and sowed propaganda seed which is expected to result in much new business during the fall.

The Ahlberg Bearing Co. did not transact much business. It did not go into the show with the expectation of closing sales but rather to advertise its product to the dealer and garageman.

The H. G. Paro Co. closed over \$7,000 worth of contracts with jobbers.

Brown & Caine, Inc., Chicago, did a good business in ignition supplies with jobbers, and is well satisfied with the results of the show.

The Metal Specialties & Mfg. Co., Chicago, took the first order of the show half an hour after it opened, the order totaling \$1,000. This was a forerunner of a week of successful selling, mostly to jobbers, although some of the newer specialties made by this company were sold at retail. Several new jobbers were signed up at the show, and this company was awarded the

blue ribbon for the most complete and easily understood exhibit in the Coliseum.

Chicago Pneumatic Tool Co. showed a kerosene generator and truck-forming attachment. On the latter business was somewhat slow, although on the generator officials of the company say they benefited from this advertising as they could have in no other way possible. The exact figures on sales have not been compiled, but it is known that over 100 generators were sold in Chicago alone, and sales outside Chicago were equally good. Sales were about equally divided between dealers and owners.

Two truck-making attachment concern—Smith Motor Truck Co., and the Redden Motor Truck Co., Inc.—were the only ones found who did not feel the results of the show warranted the expenditure of exhibiting.

The Automobile Blue Book had an exhibit and in addition to sales, which were good, 4000 touring maps were given out.

## Ford Crosses Country

During the week, a Ford fitted with an auxiliary transmission to give intermediate speed drew up to the Coliseum after having driven 2762 miles in 126 hr. on the road from Los Angeles. Total elapsed time was 13 days, 2 hr. Average speed per hour and mileage per gallon of gasoline were nearly equal, the speed being 21.3, and the fuel consumption 22 m.p.g. The longest day's run was from Holbrook to Albuquerque, 490 miles in 16 hr. The fastest part of the run was from Los Angeles to Needles, 308 miles in 10 hr., 20 min. The most difficulty was encountered between Dunlap, Iowa, and Chicago, where 492 miles were made in 28 hr. The car was fitted with a Bailey differential at Dunlap, Iowa, and came in without chains through deep mud most of the way.

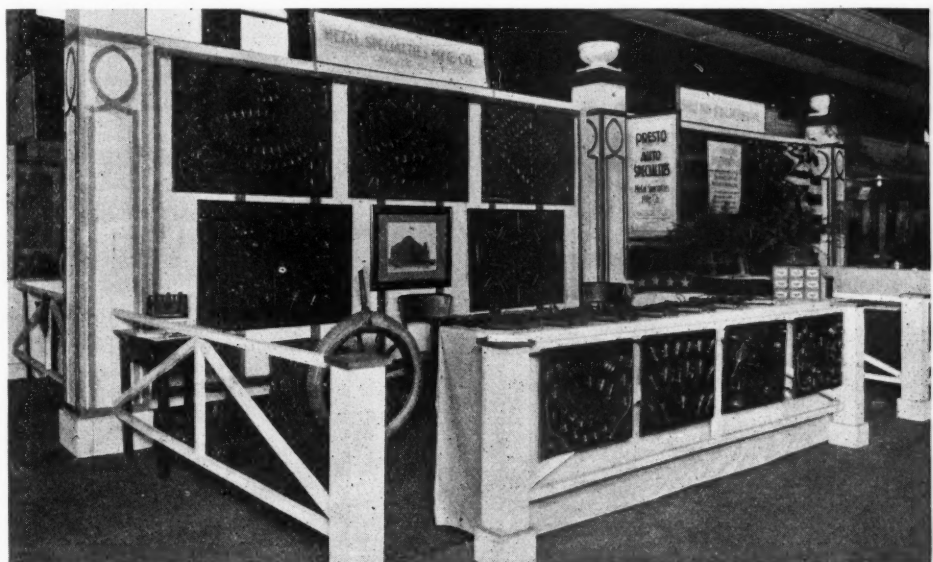


Exhibit booth of the Metal Specialties & Mfg. Co., which received the blue ribbon as the most complete and easily understood display

## WAR CANCELS RELIABILITY RUN

St. Louis, Mo., Oct. 1—The war has caused the Automobile Club of St. Louis to cancel the annual reliability run. The reason is that the men who have directed this run are all prominent in business affairs and they have been drafted into Federal business service.

# Routing Travelers Via Air

## War's Developments in Flying to Become Commerce's Gain with Peace

It is not logical that after the war development in flying will continue to be development for military purposes, whether or not peace brings with it international disarmament and hence no need for military flying. Neither is it logical that the great advance made in communication by air will cease to be used widely, that is, will not be put into commercial practice.

Other countries have been considering flying in this aspect, chief among whom perhaps is Great Britain through Lord Montagu, advising mechanical inspector to the government of India, whose plans for international air traffic have been noted in MOTOR AGE before. Lord Montagu no doubt has gone further into the minutiae of the matter than any other authority. At least the results of his observations are more accessible to us than are those of Germany, who, it is reported, also has marked the paths of the heavens as well as of the earth for the travel of man.

The English Parliament passed a law, operative in 1913, that prohibited flying over certain areas of military and naval importance and stipulated that foreign pilots alighting in that country descend in certain specified areas after giving 18 hrs.' notice in advance of their intention.

### The 3-Mile Limit

International law, however, does not recognize private or national rights in the air over the sea beyond the 3-mile limit. Over the land, by England's law, it is held that private property carries with it rights to the sky above the same area. According to this precedent, national air rights presumably would extend all over the land of any nation, and in the countries with seaboard there would be added the fringes of 3-mile limits around the coasts.

The progress of aviation, owing to its immense and increasing importance in the war for naval and military purposes, has been extraordinarily rapid during the last three years. The waiving of all patent rights and the cross-licensing of airplane makers has grown from a matter of unusual news to a matter of a detail in the whole kaleidoscope of the war work. Realization of what air power may bring in the way of decisive victories has whetted the enthusiasm of the whole world seemingly, and nations are spending millions of money on the development of aviation, while thousands of the fittest of the brave have sacrificed their lives to the battle field and to the laboratory.

The expenditure of brains and money has been prodigious, almost prodigal. To have this expenditure prove unproductive in peace would be the greatest of life's ironies. And it will not prove unproductive. It will be less so no doubt than any one other phase of modern warfare, unless

it is the motor vehicle, and even that is not a parallel case as the motor car had more than been given its start before the war. Lord Montagu talks of journeys of as many as 36 hr. by airplane.

"Already," he says in a paper read before the Aeronautical Society of Great Britain in June, "there exist machines which, by substituting a load of petrol for a load of bombs, could remain in the air over 16 hr., so I am not putting forward an impossible example."

England, naturally, views these air plans as a means to an end, closer communion with her scattered possessions, and perhaps no one better example of the possibilities of after-the-war commercial aviation could be considered for that reason. The harbors and coaling stations that have served as ministers to her naval forces and merchant marine are in such proximity that they furnish a natural chain of landing places for land and sea planes.

"For some time to come flying will be more easy over the land than over the sea, owing to the existence of well-organized landing places at every 10, 15 or 20 miles," says Lord Montagu. "Over the sea flying must be more difficult and dangerous to start with until the absolutely reliable engine is available and the movement of storms and the circulation of winds have been studied and their behavior can be forecasted accurately. In the air the currents of wind are not only far swifter than in the case of those of the sea but so swift that an adverse wind beyond a certain point will reduce any but the fastest airplanes to the position of not being able to achieve any useful speed over the surface of the globe."

Wind currents and their influence on speed are another subject which as yet the ordinary laymen has not thought of in connection with aviation. Winds of from 40 to 50 miles are not rare in the upper air in temperate zones, while 30-mile winds are still more frequent, so in some cases an airplane may have to go miles out of the direct route to get favorable currents. Everything that is known of air currents will help in laying out the best paths for our airships to travel, and more will have to be learned before the greatest efficiency in air travel can be reached. To realize the meaning of the 30-mile wind it is necessary to compare it with a sea current. A continuous 3-mile current in the open sea is rare, most regular currents not exceeding more than half of this speed, and most courses for ships are laid out to avoid or to use such currents. In regard to these currents Lord Montagu says:

In the case of flying, even a favorable 30-mile wind would add 720 miles to the day's run, while a head wind of a like speed would take 720 miles off the distance covered. In other words there would be 1440 miles difference in every 24 hr. between

a 30-mile wind favorable to the course of the airplane and a 30-mile wind against it—a difference so great as to make longer mileage a matter of comparative indifference.

What this may mean I have only to state that it is about 1800 miles from a point in County Kerry in Ireland to St. John's, Newfoundland. Assuming that an airplane started from St. John's with a 30-mile westerly wind behind it and was capable itself of a speed of 80 m.p.h., the combined speed of 110 m.p.h. over the surface of the globe would mean that in about 16½ hr. after leaving St. John's the seaplane or airplane could alight on the coast of Ireland.

With a contrary wind of 30 m.p.h. the speed of the seaplane would be reduced to 50 m.p.h. over the earth's surface, and the journey would take 36 hr. instead of 16½, or nearly 20 hr. longer.

The longer the distance the more time saved is the paradoxical conclusion as to commercial air possibilities. As an instance is cited the two alternative routes to India and beyond India to Australia and China. Before the war fourteen or fifteen days was the fastest average time by railway and mail boat to India and about thirty days to Australia. The two air routes outlined by Montagu are as follows:

### FIRST DAY

#### Southern Route to India

Miles.		Time.
	Croydon, London.... dep.	7:00 a.m.
625	Marseilles ..... {arr.	12:30 noon
	dep.	1:30 p.m.
485	Naples ..... arr.	6:00 p.m.

1110

### SECOND DAY

	Naples ..... dep.	7:00 a.m.
640	West coast of Crete.. {arr.	12:00 noon
	dep.	1:15 p.m.
485	Alexandria ..... arr.	5:45 p.m.

1125

### THIRD DAY

	Alexandria ..... dep.	7:00 a.m.
580	Jof ..... {arr.	12:00 noon
	dep.	1:00 p.m.
460	Basra ..... arr.	5:00 p.m.

1040

### FOURTH DAY

	Basra ..... dep.	7:00 a.m.
575	Bandar Abbas..... {arr.	12:00 noon
	dep.	1:00 p.m.
680	Karachi ..... arr.	6:30 p.m.

1255

Total distance, 4530 miles.

39 hr. 15 min. actual flying time.

83 hr. 30 min. total time on journey.

### Northern Route from India

#### FIRST DAY

Miles.		Time.
	Peshawar ..... dep.	7:00 a.m.
600	Bokhara ..... {arr.	12:00 noon
	dep.	1:00 p.m.
620	Gurieff (Caspian sea) arr.	6:15 p.m.

1220



## SECOND DAY

Gurieff ..... dep. 7:00 a.m.  
 600 Lagansk ..... } arr. 12:00 noon  
                               } dep. 1:00 p.m.  
 610 Tarnopol ..... arr. 6:00 p.m.

1210

## THIRD DAY

Tarnopol ..... dep. 7:00 a.m.  
 600 Leipzig ..... } arr. 12:00 noon  
                               } dep. 1:00 p.m.  
 600 Hendon, London..... arr. 6:00 p.m.

1200

Total distance, 3630 miles.  
 30 hr. 15 min. actual flying time.  
 59 hr. total time on journey.

In the northern route Lord Montagu assumes an international agreement whereby the air above a certain level will be internationalized, following the example of the 3-mile limit around the coast. On the route five countries, Afghanistan, Russia, Austria-Hungary, Germany and Holland are involved. The distance from London to Peshawar by the route is about 2600 miles and from Australia, about 7000 miles. The other route passes wholly over the sea and the land of the British Empire, though landing places with France and Portugal for the route to Gibraltar and with France and Italy for more distant landing places in Algeria, Tunis and Tripolis are considered necessary.

By these figures you will see that the air routes will save at least eleven days in the trip to India and twenty-three or twenty-four in the trip to Australia. As to regulation of air traffic the impression is that slow speed planes should use the lower levels and high speed planes the upper levels of the air. Five levels are suggested. Says Lord Montagu:

The first 2000 ft. from the surface of the ground upward should be prohibited to air traffic in general but be usable, of course, by the private owner of the soil if he desires and for the purposes of descending to his own landing or to dromes or to intermediate safety landing places.

**Sky Property Rights**

In admitting the claims that any air should be private I conform to some extent to the present law of *usque ad caelum*, but I propose to limit that right to an altitude of 2000 ft. Owners of houses and land, and the dwellers upon and in them, have a moral and probably a valid legal claim to be secured some privacy from nuisances arising from air traffic.

Above this private level we come to the commercial levels, which I propose shall range from 2000 to 4000 ft. I place this class of traffic on the lowest of the flying levels, on account of the fact that commerce will want to operate as cheaply as possible, and to achieve height and speed means extra expenditure of motor spirit, whichever way it is looked at. And I would make this 2000 to 4000 ft. level usable by silenced planes only with a maximum speed of 80 m.p.h.

Above these commercial levels I propose another zone of 2000 ft., 4000 ft. to 6000 ft. for planes, also silenced, capable of speeds between 80 and 120 m.p.h. This will include the general air traffic of the planet for ordinary flying, including a proportion of fast commercial flying. As all airplanes will shortly be fitted with supercharges, or their engines designed and built for high altitudes, high flying will become quite easy.

Above 6000 ft. to 10,000 ft. I would reserve the levels for the official planes of each nation. These levels would be used by

its naval, military and civil forces and by police planes, for air police will be needed in the same way that policing of routes by land and sea is now necessary. Specially authorized pilots, and perhaps postal services, will also use the 6000 to 10,000 ft. levels, where the international levels will begin.

Lord Montagu evidently distrusts that nations even in time of peace will be able to restrain the lawlessness and anarchy in the regions of the air without control, national and international, by police pilots on fast planes above the ordinary traffic. At levels above 10,000 ft. he would have travel internationalized free under certain regulations to all, provided the pilots comply with certain rules of traffic and their aircraft pass as airworthy. In regard to the need of silent machines he says:

There must also be no unsilenced machines regularly operating below 8000 ft.—I am not sure whether that limit is high enough—for even above that height the noise of many open exhausts and the hum of many propellers may become a continuous and nerve-racking nuisance.

It is clear also that there will be prohibited areas, naval and military centers, and flying over thickly populated districts will probably be avoided on account of a certain risk to those who are still content to crawl about on the earth. But, of course, this will not preclude, as I have said, the air liners of different countries using the lower levels when necessary under license from the countries over which they pass. Then, postal and passenger services may sometimes be driven down to lower levels owing to stress of weather.

Aircraft desiring to leave their own levels will, of course, use their wireless to ask for permission from national or international flying authorities. But in this case they should conform, at least so I think, to the rules for silence and any other restrictions which may be found necessary in the lower levels to ensure the peaceful enjoy-



Captain George Guynemer, France's best aviator, is believed to have been killed during a reconnaissance flight over Flanders, during which a comrade saw him attacked by forty enemy planes. Captain Guynemer has fifty-three German machines officially credited to him by France

ment of the earth's surface by its inhabitants. The problem of how to secure law and order on overseas routes is more difficult, and for this purpose it seems to me that we shall have eventually to define the paths to be followed within, say, certain degrees of latitude and longitude.

To keep aircraft on their own levels and in the designated paths international control would be called into service. This would be a control backed by international force—air police. Of course, when it comes to overseas flying outside the 3-mile limit it will be more of a question of routes outward and homeward rather than of exact air levels.

Buoys and marks such as used for defining channels are expected to serve as well in the air, round marks, a white ring with a black center, on the starboard on routes from west to east, checkerboard squares on the starboard of routes from, say, America to Ireland, Great Britain to Russia or India, Japan to Alaska or British Columbia, Brazil to Africa. Buoys would serve at sea, though they would have to be some 100 yd. in diameter to be seen at 10,000 ft. above. Night routes would be defined by a continuous white light on the starboard side and red and white alternating lights on the port side. A more or less intricate system of lights for night landing is outlined, with illuminated arrows and lighthouses at intervals of 10 miles alternately each side.

**To Identify Planes**

To make identifications of planes possible the national colors might be used for those engaged in official service, with all private planes white and commercial planes red. In addition all planes would be lettered and numbered as decided at some international conference, such as that which decided regulations for international motor car touring and which allotted to each country a special lettering—GB for Great Britain, F for France and D for Germany.

The effect of wind and weather on flying are considered the most important factors to be met with in air traffic. The systems of pressure and the consequent tendencies to a permanent direction of wind either all the year round or at certain seasons will have important bearing on the world's air routes. Alternative routes will be almost obligatory, according to Lord Montagu's reasoning, as wind will matter far more than mileage. The possible alternatives that he considers are naturally those that serve Great Britain and her possessions. As a whole he makes the three points that: As soon as war is over there must be national and international laws for the regulation of flying; over-sea and over-continental routes must be defined in the interests of the whole world; and the winds of the world, instead of being a drawback to flying over the surface of the planet, will, if properly used, prove to be of great assistance.

To many this may be another of those unattained Utopias, but to the world of aviation authority the realization of organized air traffic seems nearer and nearer, and if aviation continues to advance as it has during the war and as it seems probable to, extensive commercial and postal air-traffic will be not only possible but probable before another decade.

# Valves—Their Upkeep

## Snappy Action of Engine Dependent on Proper Timing and Maintenance

By B. M. Ikert

**I**F your engine is losing power, look to the condition of the valves.

If the engine back-fires they open too early.

If the engine is sluggish and overheats, they open too late.

After repeated grinding, valves become lowered in their seats and the clearance between the lower end of the stems and tappets must be adjusted accordingly. Too much clearance will make the valves noisy and open too late and there will be no snappy action to the engine. To pick out the noisy valves make a tool like that shown below out of brass, feathering one end. With engine running slip the tool between the valve stem end and tappet adjusting screw and if the noise ceases, obviously that valve has too much clearance.

### Test with Engine Running

While the engine is still running will be a good time to test for weak exhaust valve springs. This is done by inserting the tip of a screwdriver into the spring and then giving it a slight twist, as shown in the illustration. This increases the tension of the spring and if the engine picks up in speed, it is a sure sign that the spring is too weak. The exhaust valve springs sometimes lose their temper, owing to the heat they are subjected to and must be replaced with new ones, or washers placed under the lower end. Don't get too strong springs if you replace them,

for they may close the valves so hard as to break them. Too stiff springs also consume power that might be put to better use.

Before making any attempt to adjust the clearance or grinding in the valves and seeing that they are properly timed, ascertain their condition as follows:

Remove the hot-air pipe from the carbureter and slip a rubber hose over the air intake of the carbureter and have someone turn over the engine while you listen at the other end of the hose for hissing sounds. If you hear them, it is a sign that the intake valves are not seating tightly. Either they need grinding, or they are partially held open by the tappets. Back-firing in the carbureter is another symptom of this state of affairs.

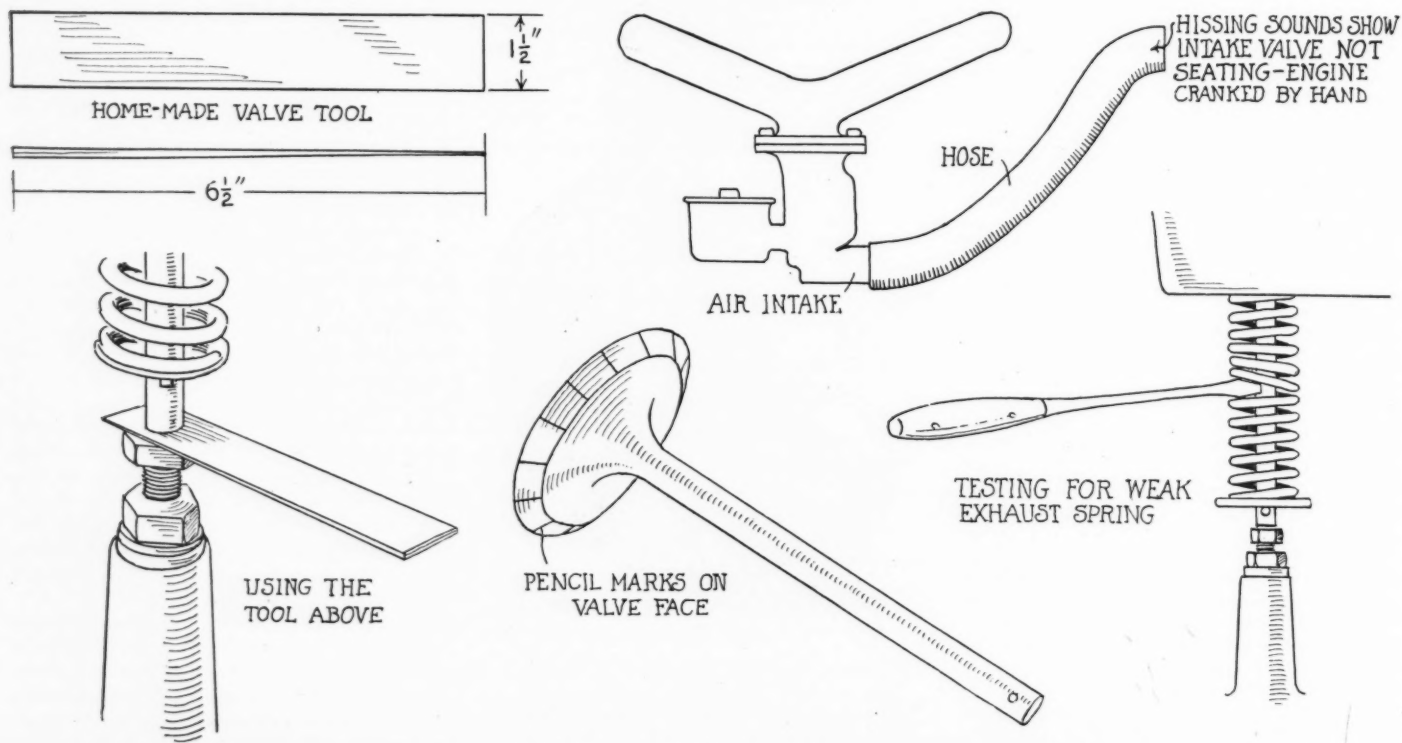
To test the exhaust valves, as to their tightness, remove the cylinder head, if necessary, and take out the valves. In some cases it is necessary to remove the valve cages to do this, while in others, there is a plug in the top of the cylinder just above each valve which when taken out, allows the valve to be pushed through the opening. Overhead valves are generally held in cages or directly in the cylinder head. Clean the face and seat of the valve and make a few pencil marks on the face at intervals around the circumference. Now

slip the valve back in place and oscillate it about a quarter turn. If all of the marks are removed, the valve is in fairly good shape, but if some remain, the valve needs grinding. So much for ascertaining the condition of the valves; we can now turn our attention to putting them back in shape in order to give the engine new life, and incidentally obtain more economical running.

Ordinarily valve grinding will remove small pits on the face and seat of the valve, but if there are shoulders or rings on them, or if the valve head is warped out of line with its seat, a reseating tool is used. This cuts away the metal much quicker and paves the way for the grinding. When valve stems become badly worn, it is almost a certainty that the guides are also worn out of round. To overcome this difficulty, ream out the holes or guides so they are perfectly true and fit valves with an oversize stem. These over-size valve stems vary in 64ths in. and in most cases 1/64 in. larger will take care of the increased opening in the guide.

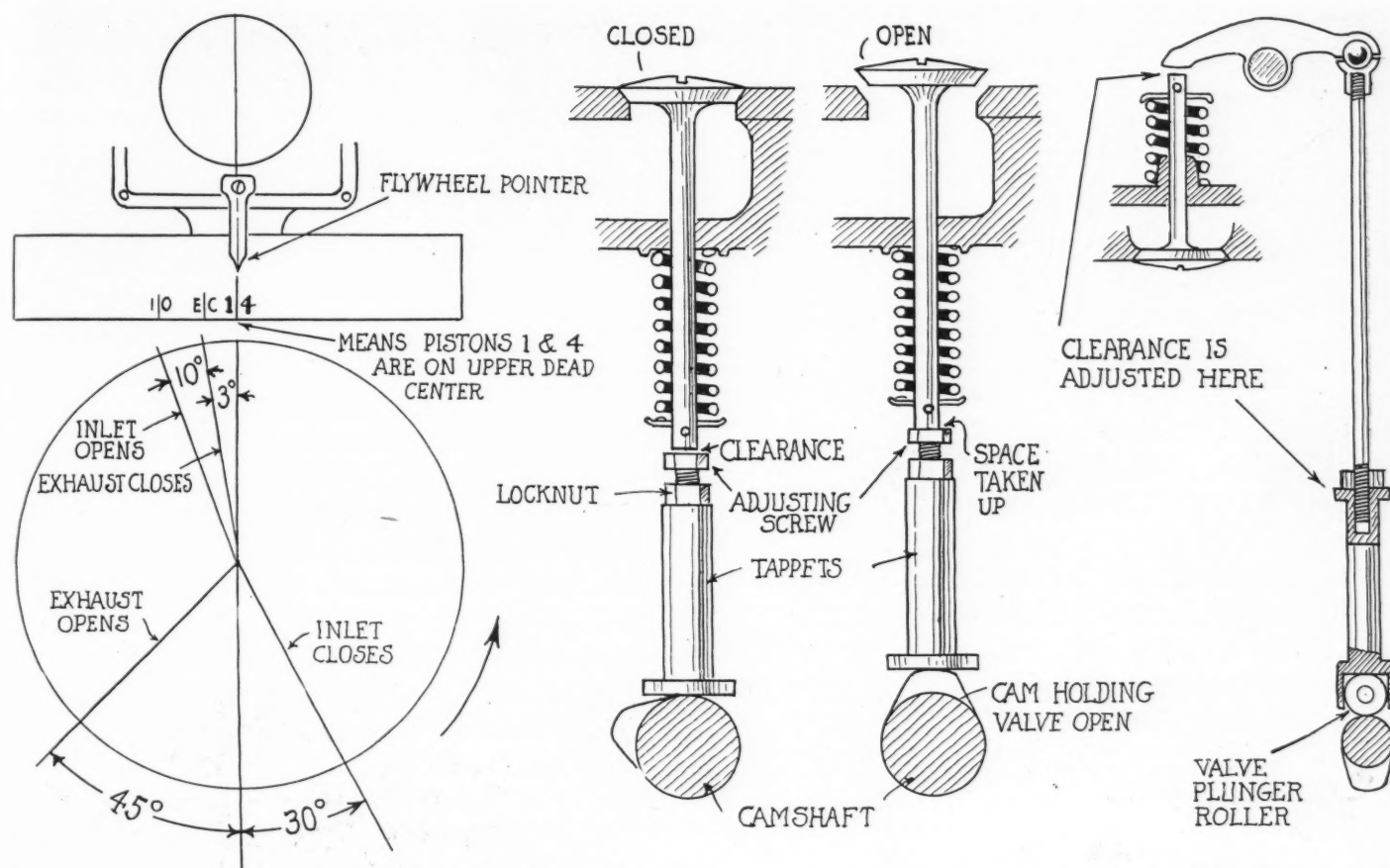
### To Grind Valves

To grind a valve, first take out the cylinder head and manifolds—if they are in the way—and use some form of valve spring lifter so you can take out the pins under the spring. After the pin or key is out the valve can be removed and the grinding compound applied to the seat.



Tools and methods used to ascertain condition of valves and springs. The home-made tool or feeler is used to find noisy valves. Pencil marks on valve are for testing the seat. Upper illustration shows how leaky intake valves are found, while the other is a means for checking up on the exhaust springs





On the left is shown a valve timing diagram to meet conditions in the average engine. The other illustrations show typical arrangement of valves when placed on the sides of the cylinder or in the head. On some valve-in-the-head engines the valve clearance is adjusted by screws and nuts on the end of the rocker arm

Put a thin coat of oil on the seat and distribute it with the finger. Then dip the finger in powdered emery and apply it to the seat also. Next replace the valve and rotate it back and forth with a screwdriver or grinding tool. The valve should not be turned more than a half revolution at a time and occasionally lifted from its seat and shifted to a new position. This will prevent rings or grooves. The grinding process is finished with a finer grade of emery. Grinding compounds put up in paste form can be had and wherever possible should be used as they are of the right consistency. About 3 lb. of pressure is enough when grinding. Test the valve by dropping it in its seat. If it bounces back lively, the seating is proper; if not, more grinding is needed or the stem may be bent. If the valves are held in cages, as in some of the over-head types of engines, the cages are taken out and the valves ground as before.

#### To Test Grinding.

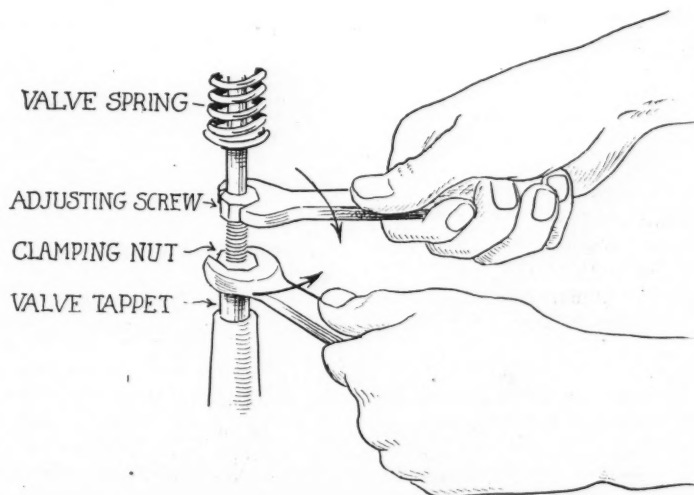
To test the grinding wash off all traces of the compound and place several pencil marks on the face of the valve. Drop it in its seat and oscillate it about a quarter turn. If the marks disappear, the job has been well done.

When replacing valves the process is reversed and if no lifter is at hand the valve springs can be compressed in a vise and tied with strong twine. The twine is cut after the pin or key and washer have been put in place. When all are in and the engine again assembled, the tappets should be adjusted, for it is likely that the grinding or reseating process has caused the

valves or at least some of them to settle lower in their seats.

Adjustment of valve clearance should not be undertaken while the engine is cold. Start the engine and even if it does run erratically for some time it will suffice to heat it. Adjust all of the exhaust valves first and then go after the intakes. Make a thickness gage so you can set them all the same; the distance is too small to be guessed at. A visiting card is of about the right thickness and can be used as a gage. Slip it between the ends of the stems and the adjusting screws on the tappets.

Loosen the locknut and screw up the adjusting nut until the paper begins to bind. Then screw down the locknut tightly. If the card cannot be inserted in the space, loosen the adjustment and turn the screw down and after inserting the paper, turn it up again as before. When making the adjustment always use two wrenches, as the setting can be done much more accurately with them. Use a thinner card for the intakes as the clearance can be made less here. Many car makers specify .003 in. for the intake valves and .004 in. for the exhaust.



How to adjust valve clearance. Two wrenches are used, one to hold the locknut and the other to regulate the adjusting screw



Brown Canyon bridge and Mount Shavand on the Rainbow route near Salida, Colo.

## Rockies' Charm Calls Tourists

### Growth of Motor Tourist Travel in the Rocky Mountain West Phenomenal

By Howard Sullivan

THE phenomenal development of transportation by motor car, whether passenger roadster or motor truck, is one of the marvels of the age. It has been so rapid and so universal that we haven't had time to take a good searching look at it. We have just accepted it as a fact and have scarcely wondered at it, though it has revolutionized business methods in a hundred different lines and has remade the pleasure map of the world. It has become an influential factor in every big and important activity of every nation and its people in times of peace, and in times of war it has played a controlling part in speeding up operations which have resulted in killing more men and destroying more property in less than three years of the present conflict than have been killed and destroyed by human agencies in any preceding 100 years of the world's history.

The growth of tourist travel by motor car is one of the many phases of this transportation revolution that would give us cause for amazement if we had time to stop a while and be amazed. It has grown up almost over night, and we have never had a chance yet to determine just how big it is. Motor travel is teaching Americans more about America every year now than

they used to learn in ten years. It is increasing the average radius of our pleasure excursions perhaps 50 per cent annually, and is becoming an important factor in improving the general health of the people of all nations where it has come into general use. It has placed the road map right up beside the latest popular novel in the list of "best sellers" the world over.

#### Worth While Scenery Appeals

The Rocky Mountain region has derived perhaps greater material benefit from this new type of tourist travel than any other section of America. The fundamental reason for this is that most travelers want to go where there is something worth while to see, and there is no part of the world where there is so much that is worth seeing as the American Rockies. A few Americans and other lovers of mountains from every country have known this for a long time and have visited the Rockies often, but it is only very recently that the American people as a whole have begun to realize that America is really worth seeing. The "See America First" movement got more free publicity for a while than Palm Beach or Bar Harbor, but it took a world war to put it across. Americans who

have been accustomed to saving their money for five years or ten years and then spending it all in a trip to the Alps are now fitting out their cars with camping outfits and visiting the American Alps every year; and they find that their own Rocky Mountains offer a wider variety and greater extent of magnificent, awe-inspiring scenery than all the ranges of Europe combined.

Of course, publicity has been an important factor in increasing tourist travel to the Rockies. Very few big things really worth while are accomplished today without generous publicity, and the Rockies have an able corps of press agents. Pike's Peak is almost as well known as Theodore Roosevelt or the Washington monument, and the Royal Gorge and the Garden of the Gods have had their pictures on the front pages of nearly every important newspaper, magazine and other periodical in America and Europe.

But more recently a campaign of publicity has been begun which is making us all more intimately acquainted with the less famous but none the less beautiful and delightful regions of the Rocky Mountain West. The United States Government has established new national parks in the midst of some of the finest scenic districts, and



the Department of the Interior, proceeding on the theory that these playgrounds of the American people are worth while only in proportion as the American people play in them, has been using newspapers, magazines and motor journals very freely, with the hearty co-operation of editors and publishers, to give us some idea of what we will find to enjoy if we visit the national parks, and what we will miss if we do not visit them. As a result of this and other publicity campaigns there are few people with ample means to travel that have not visited the Rockies or planned to visit them in the very near future, and nearly everybody who expects to have plenty of money some day is already making preparations to spend a few weeks in one of the nation's mountain playgrounds as soon as obligations to the butcher and the baker will permit.

#### Economic Benefit of Good Roads

In the meantime the entire country has awakened to the economic benefits of good roads. In the Rocky Mountain section this pocketbook appeal has brought surprisingly rapid results in the past few years. A motorist may now travel from Cape Cod to the Golden Gate by any one of at least four routes without shipping his machine over the most picturesque part of the journey. In five years more the number of feasible routes will be tripled. The good roads movement has been a little more backward in the Rocky Mountain states than in other sections of the country, but it is well under way now and nothing can stop it. The tourist may now visit most of the popular points of interest in his machine, where less than half a dozen years ago he would have been forced to travel on foot or to take flight with the Rocky Mountain canary.

Colorado has enjoyed a more generous motor travel in the last six years than any other Rocky Mountain state. During



Priest Canyon on the road to the top of the Royal Gorge near Canyon City, Colo.

1916 it had visitors every month during the tourist season from every state in the Union and from Canada. No other state had so large a number of motor visitors last year, attracted solely by the beauties of its scenery and the delights of its climate. Since Colorado is the leader among the mountain states in attracting the motor traveler, and since this type of travel in this section of the country has been developed almost wholly in the last six years, it may be worth while to analyze briefly some of the steps in this development and to present some data that carry a suggestion as to what may be done to make this travel expand even more rapidly in the six years next to come.

Possibly somewhat more than 250,000 people visited the Rocky Mountains by

motor car last year, exclusive of those who live in the six Rocky Mountain states. They came from every other state in the Union, from Canada, from Mexico, from Europe. There is hardly an accessible vista of attractive mountain scenery, from the pathless forests of the Canadian border to the bandit-tortured districts along the lower Rio Grande, that some motorist from the "plains" did not admire last year from the tonneau of his car, instead of making it out with difficulty through a haze of soft coal smoke from the window of a railroad coach, as he used to do. Indications now are that, in spite of the war, there will be more motor tourists visit the Rocky Mountains this year than in 1916.

Colorado, being the very heart of the American Rockies and having a wider



Poncha Pass and Mount Ouray near Salida, Colo. Many such scenes unfold before the tourist in Colorado's Rockies

variety and greater extent of mountain scenery than any other state, has been and is the chief camping ground of this big sight-seeing army. More people visited Colorado by motor car in 1916 than visited any two other Rocky Mountain states. More visited Colorado last year than ever visited it before in any two years. Reports made to the Colorado State Highway Commission indicate that not fewer than 26,500 cars from other states were driven into Colorado during the 1916 tourist season. They carried an average of four persons each, or about 106,000 visitors. These same reports indicate that the average time these visitors remained in the state was 28.6 days, and that the average daily expenditure per person was \$3.30. If these figures are approximately correct, and the general belief is that they are too low rather than too high, motorist visitors transferred to the pockets of Colorado people a little more than \$10,000,000 in five months of 1916.

These figures may seem rather small to us in these days of war financing, when we are accustoming ourselves to think in terms of billions rather than millions. To the people of states like Illinois, Indiana,

New York or Pennsylvania, where \$10,000,000 is only small change in the total annual revenues from the various activities in which the people are engaged, they would seem small at any time. But in a comparatively new state like Colorado they furnish a most encouraging addition to the year's returns from business activities. If the sum spent in Colorado last year by automobile tourists had been equally divided among all the people of the state every one of them would be richer by about \$10.25. The total amount was about one-tenth the value of all crops grown in the state and more than twice the silver output. It was half as much as the gold mined in Colorado last year, and the Centennial State ranks second in the production of gold. It was indeed a very tidy revenue from a business that has developed in half a dozen years, at small expense, with comparatively little encouragement and with a lot of discouragement. A business that grows from nothing to more than \$10,000,000 in six years and promises to grow even faster in the next five years is worth more than passing attention.

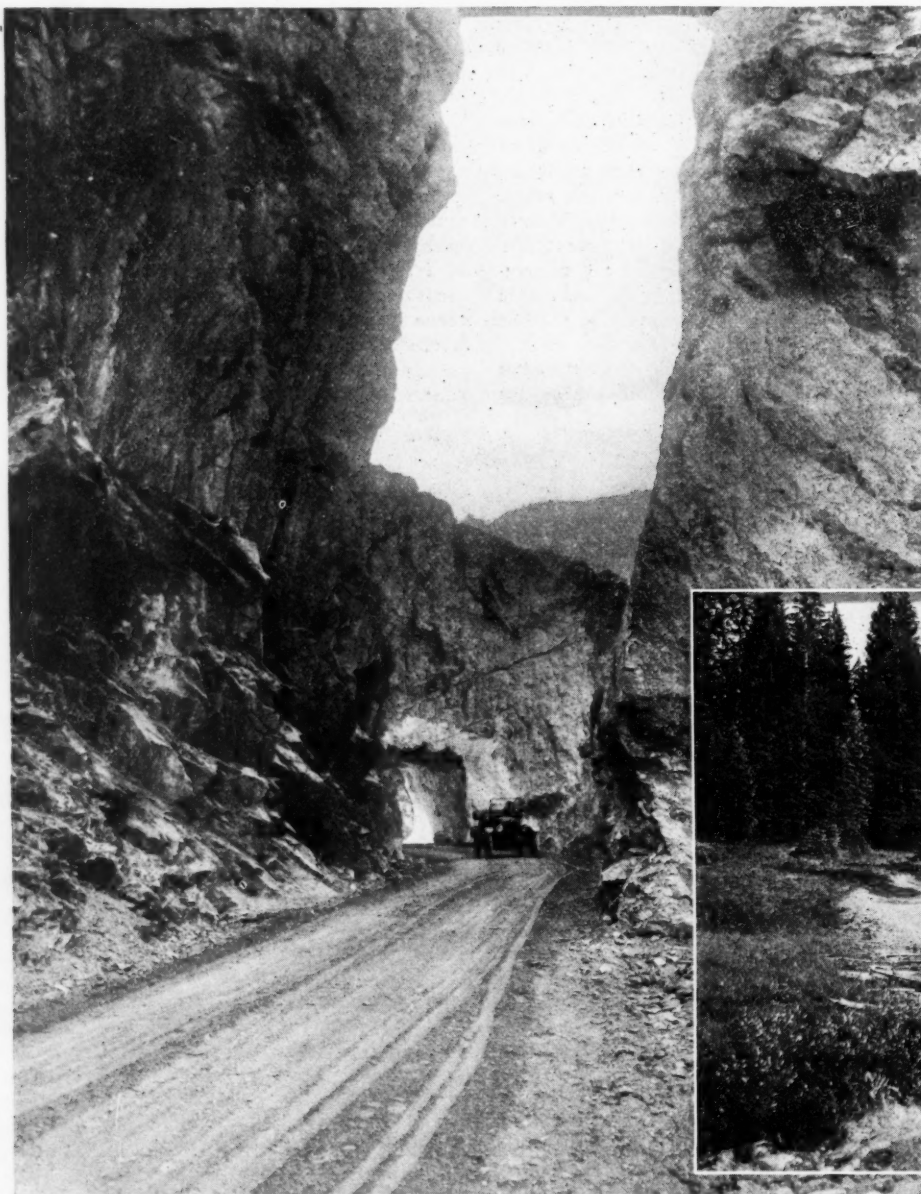
Tourist travel is by no means new in Colorado. It has been an important source

of revenue for a quarter of a century. Curiously enough, the mountains and the climate, the two principal attractions for tourists to this part of the world today, were the chief factors in keeping them away in the early history of the state. Americans had been led to believe from reading the experiences of Fremont and other early explorers that the climate of the section of the country now embraced in Colorado was so rigorous as to be endured only at the expense of deep suffering. These same explorers, knowing nothing of the nature of the country, experienced much difficulty in making their way over the rugged and broken land, and in their reports conveyed the impression that it would remain a pathless and almost uninhabited wilderness.

#### Early Travel Different

The early gold seekers soon discovered the fallacy of these first reports on Colorado's climate, but they found travel in the new El Dorado a most difficult task. They directed their rush toward the mountains, but the attraction was the glitter of gold in the mountain streams, and not the grandeur of nature's masterpieces of mountain carving. When a railroad finally followed the trail of the prairie schooner into Denver the tourist who came to enjoy Colorado's climate and to admire Colorado's mountain scenery was among the first round trip passengers. Since that day the railroads whose lines reach Colorado have been the leaders in bringing tourists to the state. Like all the roads that serve the Rocky Mountain West, they spend hundreds of thousands of dollars annually in a campaign to turn always a larger tide of tourists annually to the nation's finest vacation ground.

Motor tourist travel in this section of the country is a product of a much more brief though infinitely more rapid growth. Prior to 1910 the volume of motor travel to Colorado, tourist or otherwise, from



Left—Through towering walls of rock on the Rainbow route in Colorado. Below—This shows the character of Black Mesa road at Corral Gulch





other states was too small to have a place in the statistics of transportation. There was small enjoyment in a trip by motor across eastern Colorado plains in those days. Treacherous and shifting beds of sand sometimes blocked the way; creeks were unbridged and became impassable barriers after every summer shower; uncovered stretches of adobe and gumbo made travel a burden when the road was wet, and much of the time there was no road, other than a trail marked out on the prairie by the wagons of farmers occasionally driven that way. Even under most favorable conditions the trip from the state line to Denver, Colorado Springs or Pueblo was full of trials and vicissitudes; but after it had been safely negotiated, as sometimes happened, the roads through the mountains were infinitely worse, and the traveler, if he came to see the mountains, had no reward for his hardships. You couldn't keep the people away from Colorado then, any more than you can to-day, but if they had motor cars they left them at home and came by rail, as the only sure way of getting a "close up" view of the mountains.

#### One-tenth of 1 Per Cent Improved in 1909

In 1909 there was perhaps 25,000 miles of public highway in Colorado, though such records as were then available placed it somewhat above that figure. Of this only 25 miles was classed by the United States Office of Public Roads as "improved." The total was a little less than one-quarter of a mile for each square mile of territory, and much of it was not passable, even for horse-drawn vehicles. There was less than 500 miles of highway in the state that was in even fair condition for motor travel. These facts explain why there was almost no motor travel to Colorado prior to 1910, and the total number of cars owned in the state that year was less than 6,000.

In January, 1910, the Colorado State Highway Commission was organized, under an act of the state legislature approved May 5, 1909. It had no real authority and almost no money. It was permitted to give advice freely, but the county commissioners of the sixty counties in the state were still the dictators of the state's policy, or lack of policy, in highway matters and they followed the commission's advice only when it suited them to do so. A special appropriation of \$50,000 was made by the legislature to pay the salaries and expenses of the commission for a two-year period, and to aid in the construction of such roads as the commission might designate as state highways. During its first year the commission designated 1,643½ miles of road as state highway, and had available an average of a little less than \$3 a mile to spend on it.

But in spite of the difficulties it encountered the



The upper end of Box Canyon, showing the Spanish Trail road as it parallels the South Fork river out of Del Norte, Colo.

commission soon began to show results from its work. Public sentiment was behind it. The demand for better roads was strong, and there was a feeling that a central state commission as the directing influence in road construction and maintenance would obtain better results than had been obtained under the old method, by which each county had handled its work independently of all other counties, under the direction of its county commissioners. Scandals had arisen from the expenditure of road funds under the old system. The people of the state got perhaps less for their money in highway construction than in any other of the manifold ways their taxes were spent. Colorado's experience had been much the same as that of other states in this respect, and the people generally welcomed a change.

There was at that time no way of determining accurately what was spent on roads in the state, for methods of keeping accounts in the various counties were not

uniform and in most cases were very primitive, especially with regard to accounts that showed expenditures on public roads. Several counties made no reports at all to the State Commission. That body estimated the total expenditures on roads in Colorado for 1910 at "close to \$1,250,000," but did not vouch for the accuracy of the figures, even as an estimate. If that amount was spent in 1910 any competent judge who was in Colorado that year and was familiar with what road work was done will tell you that the taxpayers got stung for about 40 per cent of it.

The system of state highways laid out by the commission provided for three motor routes across the Rockies. That the members of the commission already were angling for the motor tourist trade is indicated by the report of that body for 1910, in which there appeared a map showing the routes across the mountains and referring to them as "tourist routes." Very few tourists traveled them in 1910, however,

for one of them has not to this day been made passable for cars and another was not put into decent shape for motor travel until as late as 1913. The third, the highway across the center of the state, a part of which now is the well known "Rainbow Route," by way of Leadville and Tennessee Pass, was the only one by which the motor tourist could have made his way across



In eastern Colorado, showing one of the many permanent and attractive bridges which are being built in plains country

the mountains that year. Under these conditions it is not surprising that there was little motor travel across Colorado in 1910, little motor travel even "in fair weather."

In 1911 the legislature sought to add a mite to the authority of the highway commission and to give it control of the expenditure of a considerable amount of money annually that had previously been paid out under the direction of the county commissioners for the construction of roads and bridges for which the legislature made special appropriations. This political "log rolling" method of building roads, or of wasting money that should have been spent to build roads, is familiar to the people of all states that have money available for highway purposes from the sale or administration of government lands. The people of Colorado very generally were much pleased when they thought they were through with it. They were disappointed for a while, however, for in some obscure way a roll call on this highway measure was omitted from the journal of one of the branches of the legislature, which opened the door for litigation. The courts held the act invalid because of this omission, and as a result a considerable part of the state's road revenues for the years 1911 and 1912 was tied up and road construction was seriously retarded.

#### Two-to-One Vote for Bonds

In 1913 the legislature corrected the error of the previous session. The authority of the highway commission was again increased and its work during the succeeding two years fully justified the confidence placed in it. It was during these two years that motor tourist travel began to assume such proportions as to attract attention. While no accurate figures are available, information from reasonably accurate sources indicates that the number of motorist visitors to Colorado during 1913 and 1914 was about 40,000.

A proposal to levy a half mill road tax was submitted to the people of the state at the November election in 1914. Business conditions were not especially favorable in Colorado at that time, yet the road measure was carried by a vote of more than two to one. Only seven counties in a total of sixty-three showed majorities against it. This added nearly \$600,000 to the state's road fund, to be spent under the direction of the highway commission. The first revenue under this levy became available for use in 1916, amounting to \$570,735.46. This brought the road fund under the control of the commission for that year up to \$753,081.27. The commission had been in existence then six years, and during its first year it had available for use on roads a total of \$46,500. During the first year of its existence motor tourist travel to Colorado from other states was practically nothing. During 1916, as previously stated, more than 100,000 such tourists visited the state during the summer and early fall, and left with Colorado people more than \$10,000,000.

The report of the highway commission for 1916 shows that more than \$2,350,000 was spent on highways in Colorado that

year. This is about \$22.80 for each square mile of area, about \$58.50 per mile of road and \$2.41 per capita. In 1910 the expenditures on roads in the state were, according to the estimates of the highway commission, "close to \$1,250,000." This figure is no doubt too high. Assuming that it is correct, however, the amount spent was approximately \$12.10 for each square mile of area, \$44.60 per mile of road and \$1.60 per capita.

While these figures show a remarkable increase in the expenditures for road construction and maintenance in six years, it is plain to anyone who has been familiar with road conditions in Colorado during the period covered that they do not tell one-half the story of improvement in highway conditions. Colorado is getting at least 50 per cent more value in serviceable highways for each dollar spent to-day than it was getting in 1910, in spite of the heavy increase in the cost of labor and of everything else that goes to make up the cost of a road. Highways are properly laid out and grades are properly established before work is begun. This means a saving of thousands of dollars annually in maintenance charges, to say nothing of the expense that had to be met under the old system for re-locating and rebuilding roads that were not properly laid out in the first place. The practice of giving road contracts to political workers in payment for votes they were supposed to have "delivered" has been largely discontinued in Colorado and roads are beginning to show the results of the change. The improvements that have been inaugurated on the state road system have been copied quickly by county commissioners on county highways.

When the present system of supervision of state highway construction was proposed for Colorado the principal argument made against it was that it would result in the development of a few "tourist" routes,

through the mountainous sections of the state, to the neglect of the roads in the rural agricultural districts. This theory found many honest supporters. Its fallacy has been demonstrated in Colorado, as it has in other states where a system similar to that in effect in Colorado has been inaugurated. In the last six years more effective work has been done in the construction and improvement of rural branch roads not included in the state highway system than has been done in any former period three times as long. The example of the fine state highway has made the unimproved county highway ashamed of itself. The result has been a constant and very rapid rise in standards among rural roads, until today some of the finest automobile highways in Colorado are rural roads built in the past two or three years, that form no part of the state highway system. The mileage of highways in remote rural districts has increased fully 25 per cent in the last six years, and it is beyond the power of percentage figures to show the improvement that has been made in the average condition of these roads in that period.

#### Colorado Thirty-First

Colorado, even though it has made very rapid progress in the past half dozen years, has hardly kept pace with the procession in road improvement. In 1914, when the United States Office of Public Roads made its latest detailed compilation of road expenditures, mileage and like data for the various states, Colorado ranked thirty-first in total expenditures for all roads outside of incorporated towns and cities, the total being \$1,937,546. This seems rather poor, when it is remembered that Colorado ranks seventh among the states in size. It does not look quite so bad when attention is called to the fact that the Centennial State ranked thirty-second in population in the count of 1910.

## Routes and Touring Information

MOTOR AGE outlines route itineraries for its readers by letter. Each week only a few of the routes asked for are published, these being those of more general interest. In asking MOTOR AGE for routes, write your name and address distinctly on a return envelope.

#### Meridian, Miss.—Baton Rouge, La.

Demopolis, Ala.—Editor MOTOR AGE—Give a route from Meridian to Baton Rouge, via Hattiesburg, avoiding Jackson. Also give distances.—N. L. Lee.

Drive from Meridian to Quitman, Shubuta, Heidelberg, Sandersville, Errata, Laurel, Ellisville Station, Hattiesburg, 113 miles, Clyde, Oloh, Columbia, 42 miles, Foxworth, Tylertown, Magnolia, 45 miles, Osyka, Miss., Kentwood, La., Greensburg, Granville, Baywood, Baton Rouge, 81 miles.

Vol. 6 of the Automobile Blue Books, published at 910 South Michigan avenue, Chicago, contains complete running directions.

#### Chicago—Fort Worth, Tex.

Chicago—Editor MOTOR AGE—Would appreciate a route from here to Fort Worth, Tex.—Mrs. C. H. Goody.

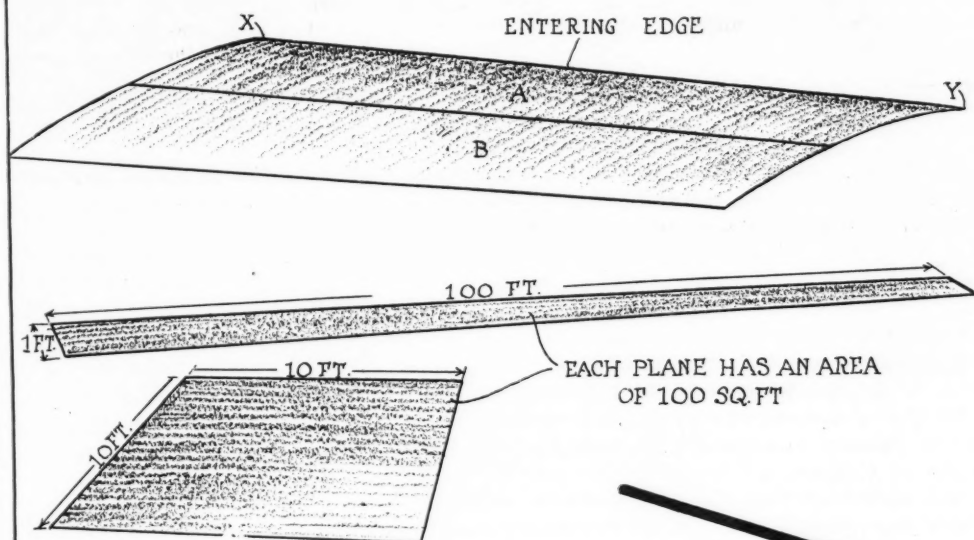
From Chicago drive to Forest Park, Proviso, Fullersburg, Hinsdale Station, Naperville, Oswego, Yorkville, Norway, Ottawa, LaSalle, Peru, Seatonville, Hollowayville,

Princeton, Galesburg, Abingdon, St. Augustine, Avon, Prairie City, Bushnell, Macomb, Colchester, Plymouth, Augusta, Bowen, Camp Point, Paloma, Fowler, Quincy, Hannibal, Mo., New London, Perry, Mexico, Columbia, Midway, Rocheport, New Franklin, ferry across Missouri river, Boonville, Arrow Rock, Marshall, Grand Pass, Waverly, Lexington, Wellington, Levasy, Independence, Kansas City, Waldo, Overland, Park, Kan., Lenexa, Olathe, Edgerton, Ottawa, Waverly, Emporia, Cottonwood Falls, Elmdale, Florence, Peabody, Walton, Newton, Wichita, Wellington, South Haven, Duray, Caldwell, Kan., Renfrow, Okla., Medford, Jefferson, Pondcreek, Enid, Bison, Hennessey, Kingfisher, El Reno, Pocasset, Verden, Anadarko, Apache, Fort Sill, Lawton, Randlett, Buckburnett, Tex., Wichita Falls, Henrietta, Bellevue, Bowie, Sunset, Alvord, Decatur, Rhome, North Fort Worth, Fort Worth.

Vols. 5 and 7 of the Automobile Blue Books, published at 910 South Michigan avenue, Chicago, contain complete running directions.

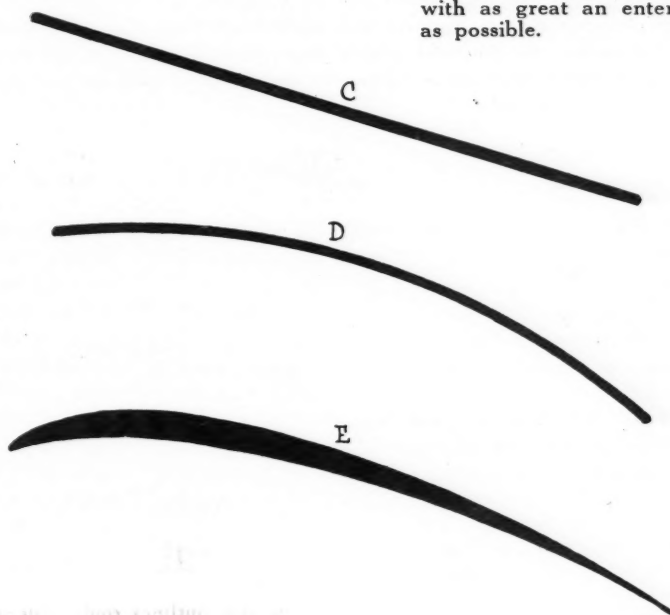


# A. B. C. of Aviation



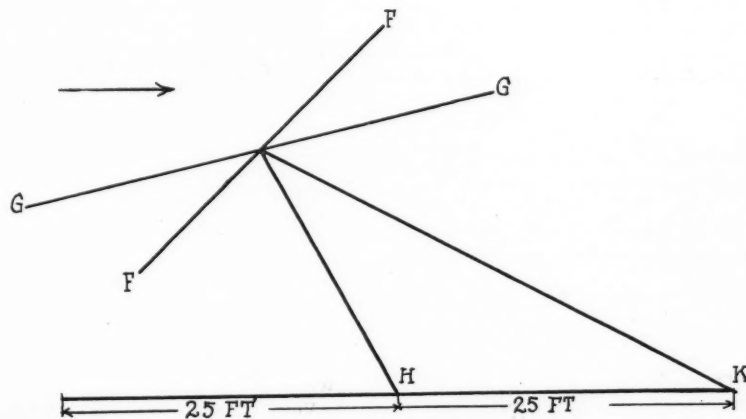
THE wings of an airplane are made as long and narrow as possible because the lifting power of a plane gradually diminishes from the entering edge rearward. This also explains why the wings of a bird are longer in span than width. For example, the two planes shown in the illustration each have a total area of 100 sq. ft., but the one which is 100 ft. long and 1 ft. wide has the greater lifting power. Also section A in the illustration has a greater lifting power than B even though the two are of the same size. If the entire surface of a plane were struck by the air, it would be just as well to employ square planes, but as it strikes only the front or entering edge X-Y, modern planes are designed with as great an entering edge as possible.

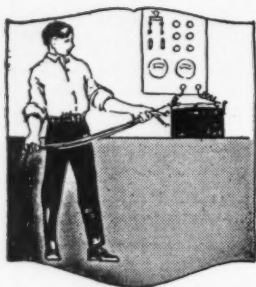
IN the opposite diagram three types of planes are noted. A simple flat plane is indicated by C. D shows a curved plane at the same angle of incidence or inclination as C. The type of plane used in modern airplane construction and which has given the best satisfaction is shown at E. By curving the surfaces slightly from front to rear, the rear part of a plane is given a chance to grip the air almost as well as the front. Better results are also obtained by making the plane thicker in front, as shown by the sectional view E. The thickest part usually lies at a point about one-third the width of the plane from the entering edge. To fly properly an airplane must be held at an angle to the wind the same as a kite. The faster the machine the more nearly horizontal will be its flying position. On the other hand, the greater the angle, the greater will be the power to drive it, but the machine can rise more rapidly on account of the greater lifting power.



TWO forces, weight and horizontal momentum, act upon an airplane when flying. Because of its inherent weight an airplane is constantly falling, but if its horizontal momentum is greater than its rate of fall, it will not only stay in the air, but actually ascend. Suppose a machine traveling at the rate of 12 m. p. h. has just enough horizontal momentum to keep it from falling. If the speed be increased to 24 m. p. h., not only the fall is prevented, but the machine rises owing to its angle of inclination. Therefore to prevent its rising, the angle is changed.

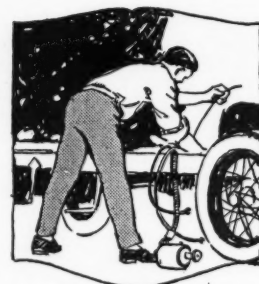
In the illustration the plane F-F has a greater angle of incidence than G-G. If the speed of F-F is 10 m. p. h., it will, while traveling horizontally 25 ft., overcome its tendency to fall to H. If its speed is doubled, it will have to travel 50 ft. horizontally before overcoming its tendency to fall at K. Therefore, unless the angle of F-F were changed to G-G for the increased speed, the machine would not move horizontally, but ascend.





# Electrical Equipment of the Motor Car

*By David Penn Moreton & Darwin S. Hatch.*



*Editor's Note—Herewith is presented the sixty-third installment of a weekly series of articles begun in MOTOR AGE issue of June 29, 1916, designed to give the motorist the knowledge necessary to enable him to care for and repair any and all of the electrical features of his car, no matter what make or model it may be. At the conclusion of this series, "Electrical Equipment of the Motor Car," with additions, will be published in book form by the U. P. C. Book Co., Inc., New York, in a size to fit the pocket conveniently.*

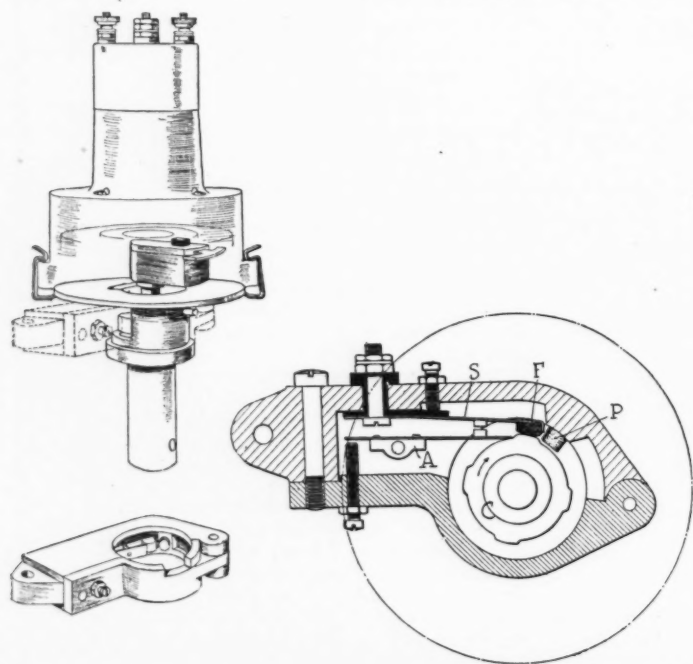
*The fundamentals of electrical circuits of the motor car were explained through their analogy to water systems, and the relations of current pressure and resistance were brought out. This was followed by an explanation of series and multiple circuits, how electricity is made to do work in lighting, starting, signalling, etc. Calculating the capacity of a battery for starting and lighting and the cost of charging storage batteries and determining the torque a starting motor must develop were explained. Action of primary batteries and dry cells was considered. A section was devoted to the makeup and action of lead and Edison storage batteries, and another to the care of lead batteries in service and the best methods of charging them. Magnets and electromagnetism then were considered, and the principles of generators and motors explained. A section on generator output was followed by one on the purpose and operation of the cutout. Electric motors and engine and motor connections then were considered. Ignition was taken up next.*

## Part LXIII—Battery Ignition Systems

THE Pittsfield system operates on the open-circuit principle and is entirely different from any of the other open-circuit systems. The principal point of difference is that contacts are brought together mechanically and separated mechanically, neither operation depending on the operation of a spring. The breaker, distributor and coil all are a single unit and the systems are supplied for four-, six-, eight- and twelve-cylinder engines. The inter-relation of the different parts is shown in Fig. 349. The breaker mechanism is shown in Fig. 350.

Normally the contacts are separated. Rotation of the cam C presses the arm carrying the lever contact up, thus bringing

the contacts together mechanically with a firm pressure and so holding them. Further rotation of the cam brings it in contact with the fiber member F on the end of the arm carrying the second contact, thus positively breaking the circuit. Still further rotation of the cam fills both arms, so that the contacts remain separated until again brought together by the rotation of the cam. The only adjustment is that which has to do with the opening of the contacts, and these are easily accessible from outside the casing. Removal of the distributor cover and coil exposes the distributor mechanism, and after the key holding the camshaft has been withdrawn the whole shaft can be lifted out in case this should be necessary. The complete device is shown in Fig. 351.



Figs. 349 and 350—Interrelation of parts in Pittsfield system, left, and breaker mechanism of Pittsfield, right

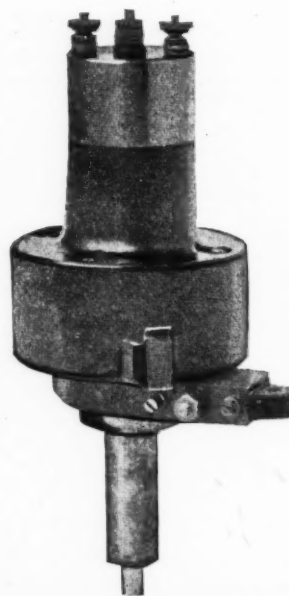
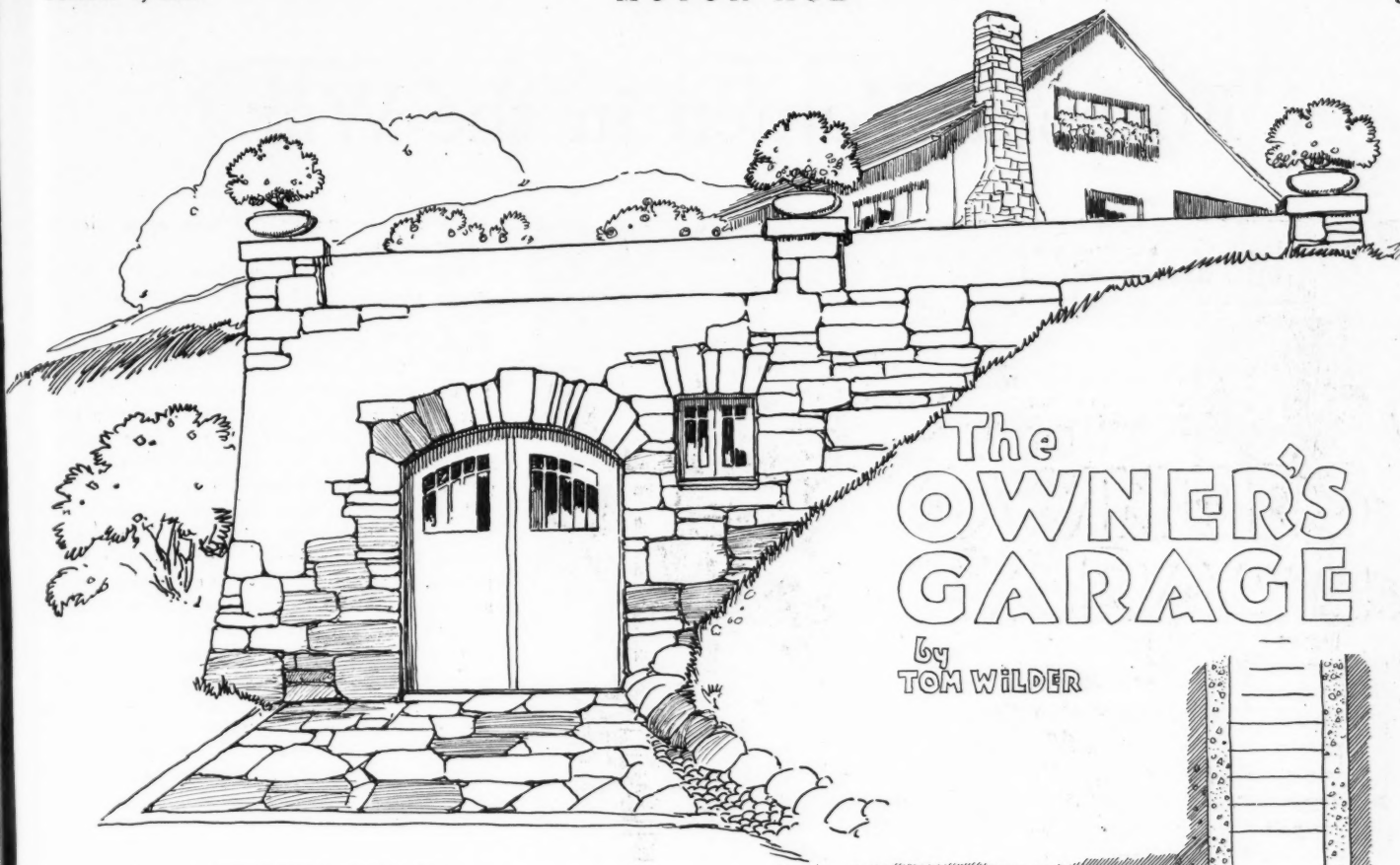


Fig. 351—Pittsfield battery ignition system complete





#### A HILLSIDE GARAGE

IN some localities, steep hillsides are prevailing style. If a man finds a spot level enough for his house, he is lucky; some are forced to climb ninety-nine steps to get to the front entrance and then walk up to the attic if they would leave by the back door.

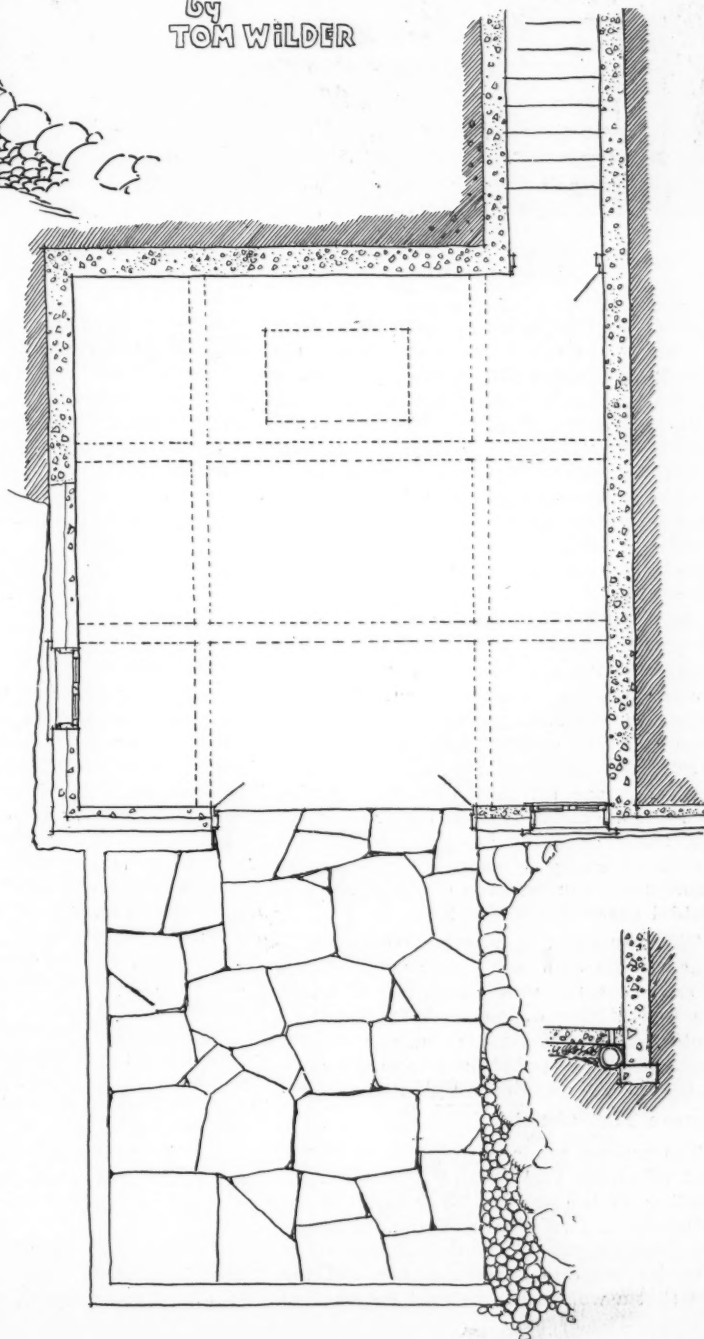
Here is a theoretical man who has taken advantage of the above conditions. To avoid climbing into his garage on low with the danger always of taking the door frame or the end of the building with him, he has excavated a small area in the hillside with an approach approximately level with the street.

In this excavation he has built his garage of concrete with a heavy reinforced concrete ceiling capable of carrying a considerable load.

The entrance side was faced with limestone artistically interspersed with patches of cement plaster, and a goodly portion of the excavated earth was piled above the building and leveled off, forming the basis of a formal garden which on such a hillside would be impossible otherwise. The stairway leading down through the garden made the garage quite accessible to the house.

A light shaft was deemed necessary at the rear of the garage. This was finished with a skylight and ventilator just above the surface of the garden, so that it did not mar the garden's appearance. A balustrade might have surrounded the shaft carrying a bench or sun dial and made a part of the garden decoration. A level space outside the garage was paved with limestone flags, forming a convenient platform for washing and making repairs in good weather. Leading away from this and along the foot of the excavated hillside, a gutter was formed of cobblestones which carried all drainage to the street gutters.

In building a garage of this kind, it is very essential to see that the walls are waterproof, as hillsides invariably have water seeping through them. A good mixture of cement is absolutely waterproof. Lean mixtures may be made tight by using waterproofing ingredients or the outside may be coated with pitch. The roof should be sloping enough to drain and covered with pitch as a precaution. A good method of handling the drainage is shown in the lower corner. Inside the foot of the wall a porous tile extends entirely around with small openings through the floor at intervals. The floor slopes very slightly from the center toward the walls.



# Foreign Women in the War



Women of the New York food aid committee are traveling about the city on a truck, demonstrating new war recipes

IT is said that nobody knows what England will do with her women after the war, but returning travelers from England of wartime tell what England is doing with them now. The most recent information to come to *MOTOR AGE* as to the new fields for women in English motoring is that of a woman chemist, a Miss Rudeen, deemed by the English themselves a "lady chemist," who has charge of the plant run by an inventor of new motor spirit process.

England has been having her own troubles with gasoline, you know, just as the United States has been having and foreseeing and just as all the countries have had. An enormous amount of effort has been spent in searching for a cheap fuel substitute. Many of the motors of England now are utilizing coal gas, carried in huge, ungainly bags on the roof of the car, truck or bus. The attachments for utilizing the gas have sprung up as thickly among the manufacturing plants as the proverbial green bay berry tree.

This invention of which a woman is in charge deals with paraffin, or lamp oil. It is said that the process, details of which are unavailable owing to lack of patent protection, is applicable to any of the crude oils, whether obtained from the earth as liquid or by the distillation of coal.

## Woman Fuel Chemist

The process produces from 30 to 60 per cent of motor fuel from the paraffin, depending on the quality. The interest lies naturally in two phases of the invention, the development of another motor spirit with its possible successful use and the fact that a woman has entered yet another

field of the motor industry. England's women have done their part nobly since the war gave them that opportunity. Not only are the English women filling the more static, or office-desk, jobs of the country, but they are going in for the hitherto foreign trades and occupations, such as repair work on motor cars and trucks, the driving of delivery trucks and buses and

work in the motor car and ammunition factories.

France has 70,000 women in the field, many thousands of them at the wheels of motor ambulances or driving supply trucks. England has her tens of thousands. Canada has sent several thousand across the sea. And from time to time there trickles through the information that women are driving the cars or trucks and working in the factories that make them in the enemy countries.

The *Autocar* says that French women have not gone in for driving motor cars, either before the war or during the war period, to anything like the extent of their sisters of Britain and America. The French government, however, has taken a step to give formal recognition to the women as a motor auxiliary of the first importance. It has issued a circular laying down rules and regulations for the employment of women in the motor services on the lines of communication in certain military regions.

The circular requires an enlistment for three months, the wearing of a uniform and the submission of measures of military discipline. When the circular first was issued—that has been several months ago—some doubt was expressed as to whether the French women would submit to the military regulations, but after seeing women in trousers shaping up "380" shells under the steam hammer at a factory near Paris, the objector changed his opinion. An intolerant and skeptical letter to the papers referred to the new class as "flirts en automobile," but the French woman long since has proved her case.

## Why the U. S. Is Fighting Waste—No. 2

### An Ounce of Meat

An ounce of edible meat—lean meat, fat and lean, suet or fat trimmed from steak, chop or roast—seems hardly worth saving.

Many households take just this view of the matter—do not trouble to put such an insignificant scrap into the ice box or soup pot—do not bother to save for cookery a spoonful or two of drippings or a tiny bit of suet or fat.

Yet, if every one of our 20,000,000 American families on the average wastes each day only 1 oz. of edible meat or fat, it means a daily waste of 1,250,000 lb. of animal food—456,000,000 lb. of valuable animal food a year.

At average dressed weights, it would take the gross weight of more than 375,000 steers, or more than 3,000,000 hogs—bones and all—to provide this weight of meat or fat for each garbage pail or kitchen sink. If the bones and butcher's waste are eliminated, these figures would be increased to 1,150,000 cattle and 3,700,000 hogs.

Or, again, if the waste were distributed according to the per capita consumption of the various meats, excluding bones, it

would use up a combined herd of more than 533,000 beef animals, 291,000 calves, more than 625,000 sheep and lambs and more than 2,132,000 hogs.

Millions of tons of feed and hay, the grass from vast pastures and the labor of armies of cattlemen and butchers also would be scrapped by this meat waste.

But every household does not waste an ounce of meat or fat every day? Very well. Make it one out of a hundred families. But keep in mind that all meat allowed to spoil and all meat and fat rendered inedible by improper cooking, scorching or burning must be counted as waste. Make it an ounce every other day or 1 oz. a month. Such waste still would be unendurable when meat is scarce and when fat is of such vital food importance to many nations.

Waste of meat or fat is inexcusable. Every bit of lean meat can be used in soups, stews or in combination with cereals; every spoonful of fat can be employed in cooking; every bit of drippings and gravy can be saved and used to add flavor and nourishment to other dishes.



# The Motor Car Repair Shop

## Care of the Stewart Vacuum System

If your car is equipped with the Stewart vacuum gasoline feed it is well to go over this before the cold weather comes should there be signs that the system is not functioning properly. About the only things that could happen to it are, failure to feed gasoline to carburetor; vent tube overflow or gasoline leakage. These will be taken up in order.

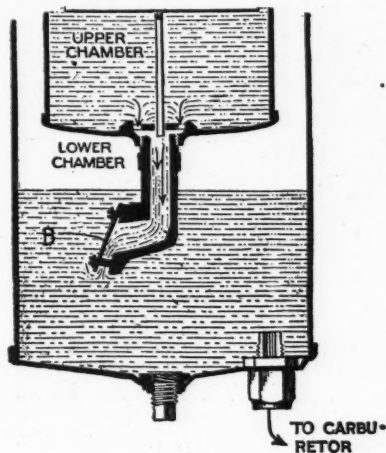
Test the feed to carburetor by flooding it and if the gasoline runs out of the float chamber, the vacuum feed is all right. Another test is to take out the inner vacuum tank, leaving only the outer shell. If you fill the latter and the engine still runs improperly, the fault lies elsewhere, unless there is a partial stoppage of fuel in the line from tank to carburetor.

If the trouble is traced to the vacuum system, remove the top of the tank by taking out the screws. Run a knife blade between the cover and body of tank to separate them without injuring the gasket.

The float, which should be airtight, may have developed a leak making it too heavy to rise sufficiently to close the vacuum valve A. This allows gasoline to be drawn into the manifold, which in turn causes the engine to load.

To test the float, dip it into a pan of hot water; the bubbles will show the leak. Mark the spot and punch two small holes, one in the top and the other in the bottom of the float, to permit the gasoline to flow out. Solder up all three holes and test again in water. Use as little solder as possible, otherwise the float will be too heavy. Be careful not to bend the float guide rod, for it will strike against the guide and retard the float, producing the same effect as a leaky one.

To determine if the flapper valve B is out of commission, plug up the air vent in the top of the tank and detach the tubing from bottom of tank to carburetor. Start the engine and hold fingers over the open-



Cross-section of chambers in Stewart system

ing in the bottom of tank. If suction is felt continuously, there is a leak in the connection between the tank and the main gasoline supply, or else the flapper valve

is being held off its seat and letting air into the tank instead of drawing gasoline. This can be remedied sometimes by merely tapping the sides of the tank, thus shaking loose the dirt or lint that may be stuck in the valve. If this does not prove effective remove tank cover and lift out the inner tank. The flapper valve is screwed in the bottom of this tank.

The air vent allows an atmospheric condition to be maintained in the lower chamber and also serves to prevent an overflow of gasoline in descending steep grades. No harm is done if once in a while gasoline escapes from the vent. If it persists, however, the following may be the cause:

Air hole in main tank filler cap may be too small or clogged. If a pressure-feed system was previously used, the latter may not have been disconnected. There must be no pressure in the main tank. The vacuum tank may be too close to the engine, in which case it should be set further back. The bottom of the tank should be at least 3 in. above the carburetor. Vent tube leakage can be overcome also by installing a longer tube and carrying the open end up to the highest point on the dash.

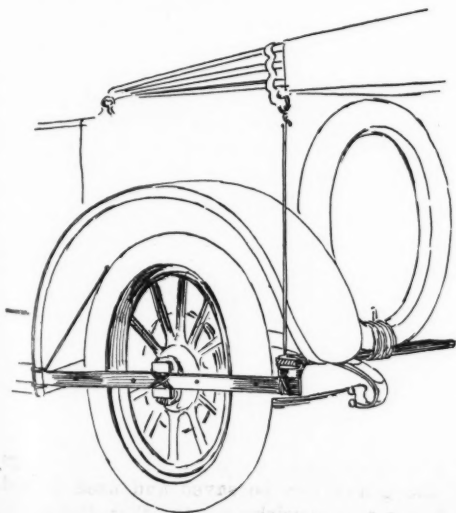
If gasoline leaks from the system except from vent tube, it can do so only from one of the following reasons:

There may be an air leak in the outer shell of tank which should be soldered up. The carburetor connection in bottom of tank may be loose. This can be remedied by screwing up the nut tighter.

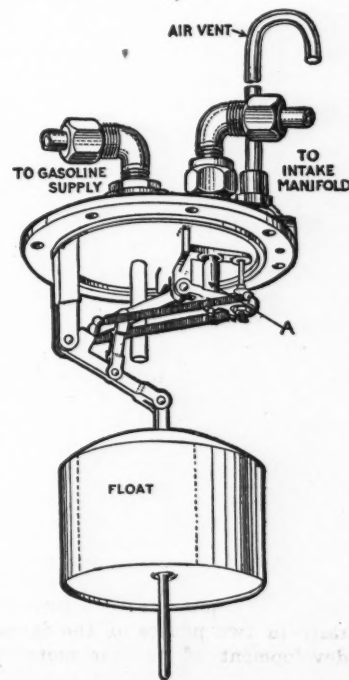
## Roadside Repairs



A screw on the locking mechanism of one of the rear axle shafts had come out and dropped to the bottom of the housing. This allowed the wheel with the attached axle to move in a direction away from the car. Immediate repairs were impossible, but here's how the driver kept the wheel and axle in place. A strip of steel on the top of the front seat support which holds the cushion in place was removed and wired at one end to the fender lip. A piece of wood was lashed to the spare tire and passed under the scroll-elliptic spring so that it crossed the steel strip. A roll of tape was put between the two to act as a bumper. The joint was lashed together and prevented from falling by a rope going from it to the top support on the car body. A block of wood which held a greased rag against the hub was fastened to the steel strip and served as a bearing. The wood block was long enough so that spring deflection did not interfere with its holding on the wheel.



Roadside repair of rear axle shaft



Float removed from tank to test for trouble

# The Readers' Clearing House

## The Electric System

### Connecting Dash Light on Chalmers

**Q**—PUBLISH a wiring diagram of the Gray & Davis lighting system used on the Model 18 Chalmers car, showing proper place to connect dash light near oil sight feed.—W. W. Bissell, Zeareing, Iowa.

This diagram is shown in Fig. 1. The instrument board light is connected in series with the tail light and acts as a check upon the latter.

Sometimes wear in the universal joint will set up a knock like yours. This joint wears in the steel pins and also the male member which fits in to the squared hole in the end of the transmission shaft. Be sure that you do not drive with the spark too far advanced.

### Connecting Spotlight on 1914 Buick

**Q**—How can I connect a spotlight on a 1914, 25 model B Buick? Give wiring diagram.—E. J. Costephens, Roscoe, Tex.

Connect one of the wires from the spotlight to the tail light terminal on the combination switch and ground the other, as shown in Fig. 2.

### Wiring of Gray & Davis System

**Q**—Show a wiring diagram, double wire system, using a Gray & Davis type T dynamo, 6½ volts, 10 amp., at 1000 r.p.m., for charging storage battery, lighting, head, side, tail, two dash lamps, spotlight and blowing a Klaxon horn. Also include the wiring of a dash ammeter, showing charge and discharge.

2—Will I need a fuse block with the above outfit? If so, show its position and describe the construction of same.

3—In what direction should the armature rotate on this type of generator? What size storage battery would you suggest for the above outfit?—W. F. Adams, St. Louis, Mo.

A diagram showing the manner of wiring the different units you ask for is shown in Fig. 3.

2—You will not need a fuse block, inasmuch as the system is provided with a cut-out. Fuses are important particularly when the single wire or grounded return system is used.

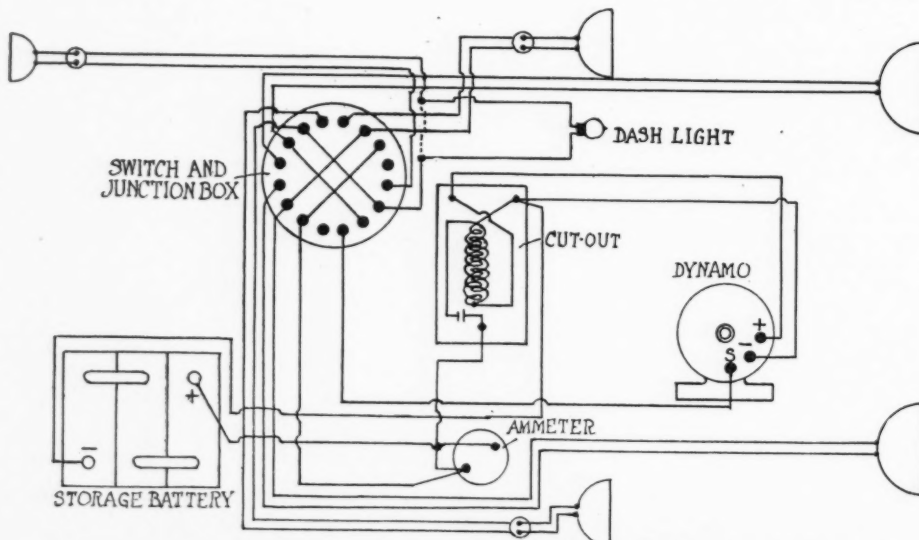


Fig. 1—Wiring diagram showing connection of dash light in Gray & Davis lighting system on a Chalmers 18 car

**TO** assist readers in obtaining as a unit all information contained in this department on a certain subject in which they may be most interested, such as ignition, carburetion, etc., MOTOR AGE has inaugurated the segregation of inquiries into classes of allied nature. Questions pertaining to cooling will be answered under that head and so on.

### THE ELECTRIC SYSTEM

W. W. Bissell.....Zeareing, Iowa  
J. M. Castleman.....Los Angeles, Cal.  
W. F. Adams.....St. Louis, Mo.  
E. J. Costephens.....Roscoe, Tex.

### ENGINES

William Gilbert.....Pueblo, Col.  
Albert Fountain.....Circle, Mont.  
E. B. Probasco.....Sparta, Ill.  
W. R. McQuigg.....Wooster, Ohio  
William B. Miller.....Galena, Kan.  
R. C. King.....Wichita, Kan.  
W. W. Bissell.....Zeareing, Iowa

### LUBRICATION

Welley H. Brown.....London, Ky.  
Albert Fountain.....Circle, Mont.

### REBUILDING

E. S. R. S.....Chicago  
J. N. Littlejohn.....Gaffey, S. C.

### CARBURETION

G. H. Barieger.....Los Angeles, Cal.  
Paul Snick.....Wolcott, Ind.

### MISCELLANEOUS

Sidney Topness.....Wolford, N. D.  
L. G. Buckner.....Memphis, Tenn.  
Herbert A. Trask.....Concord, N. H.

No communication not signed by the writer's name and address will be answered in this department.

3—The armature rotates in a clocklike direction, viewed from the front of the instrument when installed. Use a 6-volt battery.

### Set or Variable Spark?

**Q**—I have a set spark Bosch magneto. Would it be worth while to change it to variable spark? If so, what would be the probable cost?—J. M. Castleman, Los Angeles, Cal.

You do not state whether the instrument is used on a passenger car or truck. But assuming that you have it on a pleasure car which is driven over city and country

roads, especially hilly roads, changing the instrument so that the spark will be variable, is in the majority of cases beneficial. With a variable spark, it is possible to slightly retard the spark on a stiff climb and secure better results from the engine. According to the Chicago branch of the Bosch company the cost of making the change will vary from about \$6 to \$10 depending on the type of instrument.

## Engines

### Bore and Stroke of 1914 Buick

**Q**—What is the bore and stroke of a 1914 Buick, B-55?—William Gilbert, Pueblo, Colo.

The bore is 3.75 in. and the stroke 5 in.

### Knock Due to Valve Cage

Replying to C. A. Douglas, I would like to say that the knock in his Buick Six could be caused by one of the exhaust valve cages being turned.—Albert Fountain, Circle, Mont.

### Overheats and Backfires

**Q**—I have a 1916 Hupp model N, which has been run 3300 miles. Several weeks ago it developed a miss and would heat up. I found my high and low tension ignition wires oil-soaked and replaced same. This removed the miss, but it still heats a little.

2—When running the engine at night, I can see little blue streaks of electricity jumping between terminals at Atwater Kent, and also from wires to gas tank. The Bijur service man (I have Bijur system on this car) told me this was simply the static current and did not amount to anything. Is he right?

3—I also have trouble with the engine, although it has power and runs fine. Upon turning the ignition switch, on dash, to off position, the engine will often give several explosions and smoke issues from the carburetor. I have had the carbon burned out. One repair man said this after ignition could be caused from valves not closing. I have had the generator and starter examined by the Bijur service station, and they are O. K. What do you think regarding the static electricity and after explosions? I have never had switch on dash inspected, but it seems to be O. K.—E. B. Probasco, Sparta, Ill.

1—The heating might be caused from something besides the miss, which seems to be born out by your statement. The engine may be full of carbon or the valves need regrinding. Perhaps the spark control mechanism has shifted so that you may be driving with a retarded spark, although the lever may show the advanced position. Insufficient lubrication or too light an oil might cause overheating. Thin or poor oil will decompose readily, thus leaving the walls of the cylinder and pistons comparatively dry and the friction causes the engine to become hot. Clogged radiator tubes or water passages and sagging of the inner layers of the hose connections—which reduces the size of the openings—may be responsible for the trouble. Also make sure that the fan belt does not slip. You may remedy the overheating by slightly bending the blades of the fan so that it sucks more air.

2—Static electricity will not hinder the proper operation of the ignition, but it is better to remedy it. Sometimes a thin



film of oil adheres to the terminals or other parts of the distributor or high-tension wires affording a path for the static current. It is well to keep high-tension wires separated by the use of fiber clamps and occasionally wipe the ignition apparatus clean from any oily deposits.

3—The after explosions may be caused by red hot plug points or particles of carbon which, after the switch is turned off, continue to fire a few incoming charges of gas. Some of the gas will burn slowly and the smoke find its way back to the carbureter. A leaky intake valve will do the same, but if this were the case, your engine would not run as nice as you say it does. A weak mixture will produce backfiring because it burns so slowly that the flame continues until after the time of opening of the intake valve. The incoming charge will be ignited by the still-burning gas in the cylinder and blow back through the carbureter.

#### Long Stroke Has Better Combustion

Q.—Has the long stroke motor proved to be a success?

2—Will a six-cylinder motor with a 3-in. bore and stroke of  $4\frac{1}{4}$  in. or  $4\frac{1}{2}$  in. use more gasoline and oil than a four-cylinder motor with a bore of 3 in. and a stroke  $5\frac{1}{4}$  in.?—W. R. McQuigg, Wooster, Ohio.

1—The long stroke engine shows more complete combustion of the charge than the short stroke. When the spark occurs its heat is transmitted to a molecule of the gas, let us say, and for all practical purposes this is correct. The molecule of the gas being in communication with other molecules, the heat is passed from one to the other until each molecule is burned or exploded. This is called flame propagation or flame spreading. Assuming the same displacement in the short stroke engine the passing of the heat from one molecule to another takes place through the time  $t$ , let us say, while in the long stroke engine, this time is increased considerably to  $T$  for example. In the long stroke engine the heat will be transmitted to the whole charge for a period  $t-T$  greater than in the other. In other words, the greater the length of time the charge is in contact with a heated element, the more complete the combustion up to the point where all is burned.

In some ways the long stroke engine might be compared to a long-barrel gun. The latter will give the cartridge more penetrating power than a short barrel gun, because the force acting behind the bullet, which is the same in both cases, is acting for a greater length of time in the long barrel gun. In the long-stroke engine the molecules are given a greater length of time to all be consumed and to exert their energy on the piston.

2—Theoretically both will use about the same amount of fuel, but the smoother running of the six might throw things in its favor.

#### Position of Piston in Ford Engine

Q.—In what position is the piston in a Ford motor when the explosion occurs with the spark retarded, advanced? Specify in degrees.

2—Does speed develop horsepower? If not, what does?—William B. Miller, Galena, Kan.

1—With the Ford engines if the spark lever is set for late ignition the spark occurs when the piston is  $\frac{3}{8}$  of an inch down on the power stroke. When the spark lever is set for early ignition the spark oc-

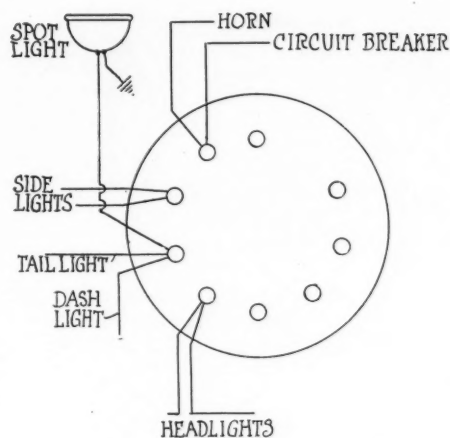


Fig. 2—Wiring diagram of spotlight connections on 1914 Buick

curs when the piston has still  $\frac{1}{8}$  in. to move up on the compression stroke.

2—Horsepower is made up of two factors, viz., force and speed. If a weight of 33,000 lb. is lifted at the rate of 1 ft. a minute, power is developed at the rate of 1 hp.; the same if a weight of 1000 lb. is lifted at the rate of 33 ft. per minute. In an engine, where we have rotary instead of rectilinear motion, the two factors are torque, or turning effort, and speed of revolution. The former is measured in pound-feet, and the latter in revolutions per minute. One pound-foot is a turning effort of 1 lb. at a radius of 1 ft. At 1000 r.p.m. a torque of 5.28 lb.-ft. is required to make one hp. As long as the turning effort remains the same, the horsepower increases directly as the speed. If a certain engine develops its maximum horsepower at 1000 r.p.m. and another engine of the same cylinder dimensions develops its maximum horsepower at 2000 r.p.m. then, since the torque is determined chiefly by the cylinder dimensions and should therefore be the same for the two engines, the latter engine would most likely produce twice the horsepower that the former produces.

#### Bearings in 3 by 5 Engine

Q.—What size bearings should be used in a motor 3 by 5 in. bore and stroke; also in a motor with bore and stroke of  $3\frac{1}{2}$  by 5 in.? Give this

information in area for surface for crankshaft bearings; also for connecting rod bearings.

2—Give the length of the bearing and the size of the crankshaft at bearing point as it should be in your opinion for both crankshaft bearing and connecting rod bearing.

3—What would be the proper size of piston pins for such a job?

4—What would be the relative strength of bronze back bearings or bronze bearings as compared to that of bearings made of high class white metals?—R. C. King, Wichita, Kans.

1-2-3-4. In a four cylinder engine with three main bearings on the crankshaft, if the cylinder dimensions are 3 by 5 in., the crank pin and the front and intermediate main bearings each should have about 2.75 sq. in. projected bearing surface, each, and the rear main bearing, 3.85 sq. in. If the cylinder dimensions are  $3\frac{1}{2}$  by 5 in. the crank pin and the front and intermediate main bearings should have 3.75 sq. in. of projected bearing surface each and the rear bearing 5.20 sq. in. In the 3 by 5 in. engine the crankpins and main journals would be  $1\frac{1}{2}$  in. in diameter and about  $1\frac{7}{8}$  in. long and the rear bearing  $2\frac{1}{2}$  in. long. In the  $3\frac{1}{2}$  by 5 in. engine the crank pin and main journals would be made  $1\frac{3}{4}$  in. in diameter and  $2\frac{1}{2}$  in. long, and the rear main journal would be made 3 in. long.

The piston pin is usually made of a diameter equal to  $\frac{1}{4}$  the bore, and if it has a bearing in the connecting rod the length of this bearing is made equal to  $\frac{1}{2}$  the bore. If the pin has bearings in the piston bosses the length can be made slightly greater.

We do not know exactly what you mean by the strength of the bronze-backed bearings, etc. Do you mean the capacity for carrying bearing loads or do you mean the resistance of the bearings to deformation by tension, compression or other forces?

#### Fitting Aluminum Pistons

Q.—Would the use of aluminum pistons be advisable in a model 18 Chalmers car, which has a bore of 4.25 in.?—W. W. Bissell, Zearing, Iowa.

Experience seems to show that the best practice of fitting aluminum pistons lies in putting them in cylinders not much over 3 in. in diameter. The chief drawback to aluminum pistons is the slap when the engine is cold. When cold the clearance of an aluminum piston is much

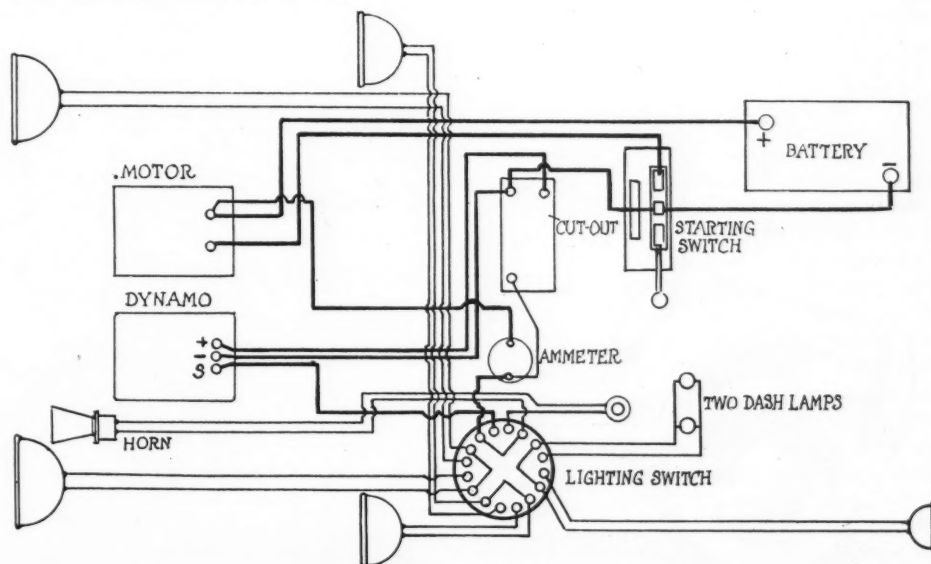


Fig. 3—Wiring diagram of Gray & Davis that includes two dash lamps, dash ammeter and various other units

greater than that of cast iron, therefore until the engine is warmed up there is more or less knocking. As the heat increases, however, the noise should cease.

If you do decide to fit aluminum pistons see that there is a rib or re-inforced run from the piston-pin boss up to the top piston head on the inside. Also several ribs should be cast across the inside of the head. This not only stiffens the piston but helps in carrying away heat from the explosion. From .007 to .008 in. clearance at the top should be given the pistons at the top and if this large clearance leads to oil pumping and fouled plugs, it can be obviated by turning an oil groove just below the lower ring groove. These oil grooves should be about  $\frac{1}{8}$  in. deep and  $\frac{1}{4}$  in. wide, having the lower corner rounded off. About eight  $\frac{1}{2}$  in. holes are drilled through the groove at equal distances around the piston, slanting downward towards the inside. The top corner of the ring should also be slightly rounded. As the piston moves upward, the rounded edge of the ring and the groove tend to slide over the film of oil on the cylinder wall, while in going down the sharp lower edge of the ring scrapes the oil into the groove and it runs through the holes to the inside of the piston and back to the crankcase.

Naturally the condition of the engine will determine if it is worth while to fit lighter pistons. If the cylinders are worn to a great extent, or worn oval, they must be reground perfectly true before aluminum pistons are installed.

## Lubrication

### Oiling System on 1911 E. M. F.

Q.—Explain the oiling system on 1911 E. M. F. cars, showing illustration.—Wiley H. Brown, London, Ky.

The Flanders oiling system as was used on this car is automatic in its action, so long as the reservoir is kept supplied with oil and the filler cap screwed down tight. Its principle of operation is by vacuum and if the cap is not screwed down tight, it will cause an air leak that will release the vacuum and allow the entire amount of oil to flow into the crankcase, flooding the engine.

As shown in the illustration, two supply pipes A and B run from the bottom of the oil tank to the bottom of the crankcase. With the crankcase dry and the oil tank full, the air, being lighter than the oil, will pass through the oil supply pipes to the top of the reservoir. This action relieves the vacuum in the reservoir and

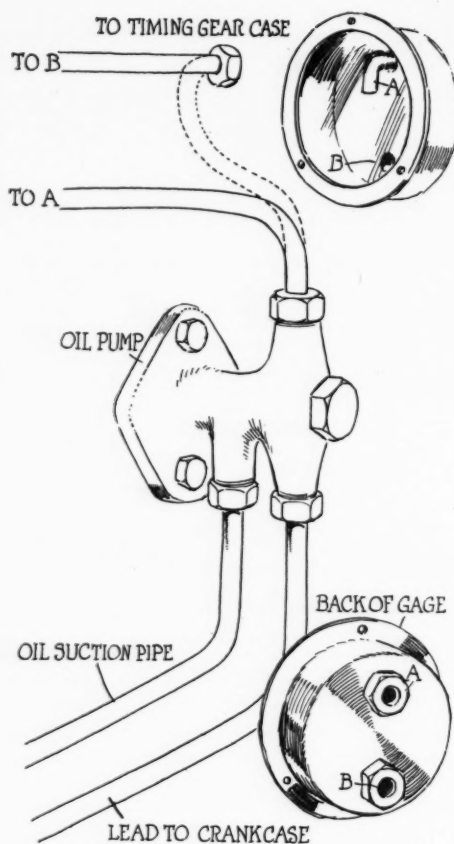


Fig. 4—Suggestion for putting an oil gage on a 1917 Buick

allows the oil, it being heavier than the air, to flow into the bottom of the crankcase. When the oil in the crankcase has reached a height that will cover the openings of the supply pipes, obviously the air will be shut off, causing a vacuum in the tank which will hold the remaining body of oil until such time as the engine has consumed a sufficient amount of oil to uncover the pipes again. This, in turn, will allow the air to pass through and release sufficient oil to re-cover the openings in the pipes, thus maintaining a constant level.

### Oil Gage On 1917 Buick

Q.—Is there any practical way to put an oil sight feed on a Buick D-34, 1917, or a pressure gage?—Albert Fountain, Circle, Mont.

In Fig. 4 is shown a suggestion for putting an oil gage on a 1917 Buick. Normally the oil is pumped from the crankcase sump by a plunger pump from which a pipe carries some of the oil to the crankcase for the connecting rods, etc., the other oil going to a lead to the timing

gears. The latter is shown by the dotted lines in the illustration. In order to know that oil is being pumped properly a sight feed gage can be placed on the instrument board and connected to the system as shown. A pipe is run from the top connection A on the gage to the top of the pump, the other pipe going from B to the timing gears. The oil will now be pumped through the gage before it reaches the timing gears making it possible for the driver to ascertain whether or not the oiling system is functioning correctly. So long as the oil shows in the gage, the crankcase will get oil, because the feed pipe to it is lower on the pump than that going to the timing gear case as shown.

## Rebuilding

### Rebuilding Ford for Touring

Q.—Publish a diagram showing how to convert a Ford chassis into a speedster for touring, which will take care of traveling baggage.—E. S. R. S., Chicago.

A method for rebuilding a Ford for touring with ample provision for baggage carrying is shown in Fig. 5.

### Lowering Frame of Old Buick

Q.—What is the best way to lower the frame of a model No. 16 Buick?—Jos. N. Littlejohn, Gaffney, S. C.

This car is such an old model that it would hardly pay you to undertake the job. You might get some reduction in the overall height by underslinging the springs on the axles instead of having them on top as they are now. This would mean making eight U-bends or hooks having the ends threaded, one to go on each side of the spring. A plate with four holes in it can then be placed over the threaded portions and held in place with washers and nuts. Another way would be to fit a new frame which had a decided kick-up over the rear axle and support the frame in front and rear by semi-elliptic springs that are almost flat, like those of some racing cars. This would be quite an expensive procedure and the results would hardly be worth the effort.

## Carburetion

### Adjusting Stromberg Model H

Q.—What is the proper adjustment of an H No. 2 Stromberg carburetor on an Oakland model 50, eight-cylinder?—Paul Snick, Wolcott, Ind.

The low speed adjustment is controlled by a needle valve seating in the primary nozzle opening, which opening is about two sizes larger than usually necessary, thus giving a limit on this adjustment. When the engine is idling the air valve should always be entirely closed.

The high-speed adjustment is by regulating the position of the auxiliary gasoline needle valve in relation to its seat, which is carried in in the air valve stem. The end of the needle carries a small cap and projects above the nut. During the first small opening of the air valve, this needle, being seated, travels downward with the valve. When the needle cap strikes the nut the needle stops moving and any further opening of the air valve lowers the needle seat, thus bringing in the auxiliary or secondary gasoline supply. After passing the needle seat the gasoline rises up along the needle and is delivered into the air stream at the edge of

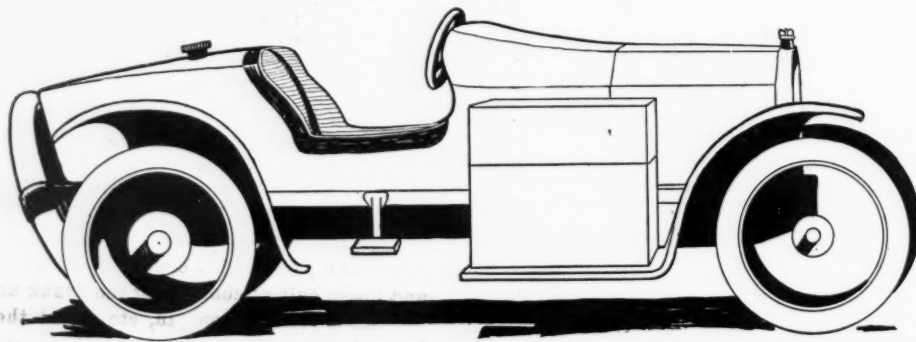


Fig. 5—How a Ford car looks rebuilt into a speedster for touring with baggage carrier on the side



the air valve. The high-speed running adjustment is secured by varying the position of the nut downward—clockwise—giving less gasoline and upward, more. Normally there should be at least  $\frac{3}{8}$  in. clearance between the needle cap and nut when air valve is entirely closed.

#### Shorter Manifold Desirable

Q.—Would shortening the intake manifold and using a Schebler carburetor improve the carburetion in a 1914 Trumbull? I am getting poor results from a Zephyr.—G. H. Baringer, Los Angeles, Cal.

There is no question but what shortening the manifold on your engine would improve carburetion. It may be that the long manifold now installed is directly responsible for the poor results you are getting from the Zephyr carburetor. An engine with a very long inlet manifold is apt to load up, as it is called, at slow speeds because the flow of mixture through the manifold is so slow comparatively that there is an opportunity for condensation. The liquid gasoline resulting from the condensation drops down into the carburetor and is carried up again into the engine. The real trouble is caused by the gasoline globules travelling to convenient cylinders only, leaving one or two perhaps free to get a more or less correct mixture. The remedy is to get as much heat as possible to the inlet manifold to assist the vaporization, or shorten the manifold.

## Miscellaneous

### Meaning of Abbreviations

Q.—What do the following terms mean: S. A. E., A. L. A. M., and N. A. C. C.?

2—Where is the Pierce-Arrow car manufactured?

3—By the various horsepower ratings, what is the horsepower of the Maxwell?—Sidney Topness, Wolford, N. D.

1—S. A. E. is an abbreviation of the name Society of Automotive Engineers; A. L. A. M., American Licensed Automobile Manufacturers and N. A. C. C. are the initials of the National Automobile Chamber of Commerce.

2—The Pierce-Arrow car is made by the Pierce-Arrow Motor Car Co., Buffalo, N. Y.

3—By S. A. E. formula, the horsepower of the Maxwell car is 21 hp. The formula is stated as follows:

$$D^3 \times N$$

2.5

in which D is the diameter of the piston in inches, N the number of cylinders and 2.5 a constant. When figured by this formula the horsepower is at 1000 ft. piston travel.

### Counterbalancing Weight Needed

Q.—What percentage of connecting rod and piston does counterbalance weight require?—L. G. Buckner, Memphis, Tenn.

If it is desired to completely balance each throw of a crankshaft, balance weights must be provided on the crank arms to counterbalance the crank arms and pins, the connecting rod and the piston. It cannot be said that a certain weight is required to balance these parts, as the balancing effect of the balance weight depends upon its distance from the axis of the crankshaft. It is the moments around the axis of the crankshaft that must be in balance, and these moments are obtained by multiplying the weight into the distance from its center of gravity to the axis of rotation. The crank arm and pin must be completely balanced, that is, a balancing moment must be provided by the balance weights equal to the moment of the crank arms and crank pin around the crankshaft axis. The name applies to the lower part of the connecting rod, which is considered to have a rotary motion. This would include the connecting rod head and one-half of the shank and the weight of this part of the connecting rod would be considered as centered at a distance from the axis of rotation equal to one-half the piston stroke.

### Reciprocating Motion

The piston, piston pin, upper connecting rod boss and the upper half of connecting rod shank have a reciprocating motion. It is not possible to completely balance a reciprocating part by a rotating part, but the vibrating force due to the reciprocating part can be halved by providing a rotating part the centrifugal force on which is equal to one-half the maximum inertia force on the reciprocating part.

Therefore considerable weight of the piston, rings, piston pin, upper connecting rod boss and upper half of the connecting rod shank located at the crank pin axis and provide balancing weight on the crank arms opposite the crank pin which produces a moment around the crankshaft axis equal to one-half the moment of the parts enumerated around the same axis. The balancing weights or moments required for balancing (1) the crank arms and crank pin, (2) the connecting rod head and lower half of connecting rod shank and (3) the piston, piston pin, etc., must then be added to obtain the total balancing weight or balance moment required.

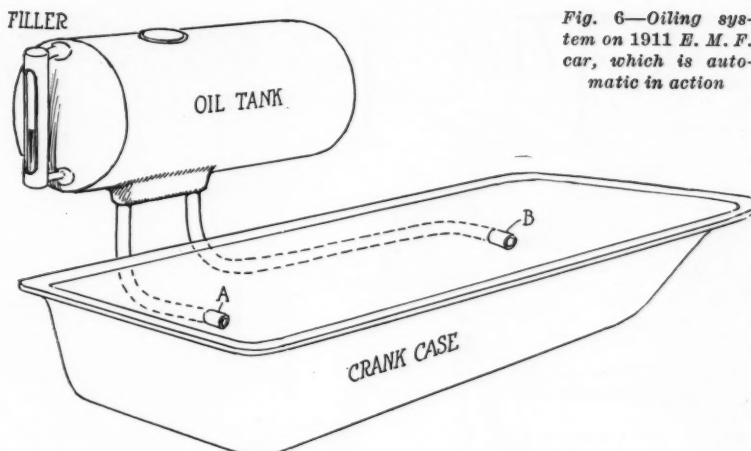


Fig. 6—Oiling system on 1911 E. M. F. car, which is automatic in action

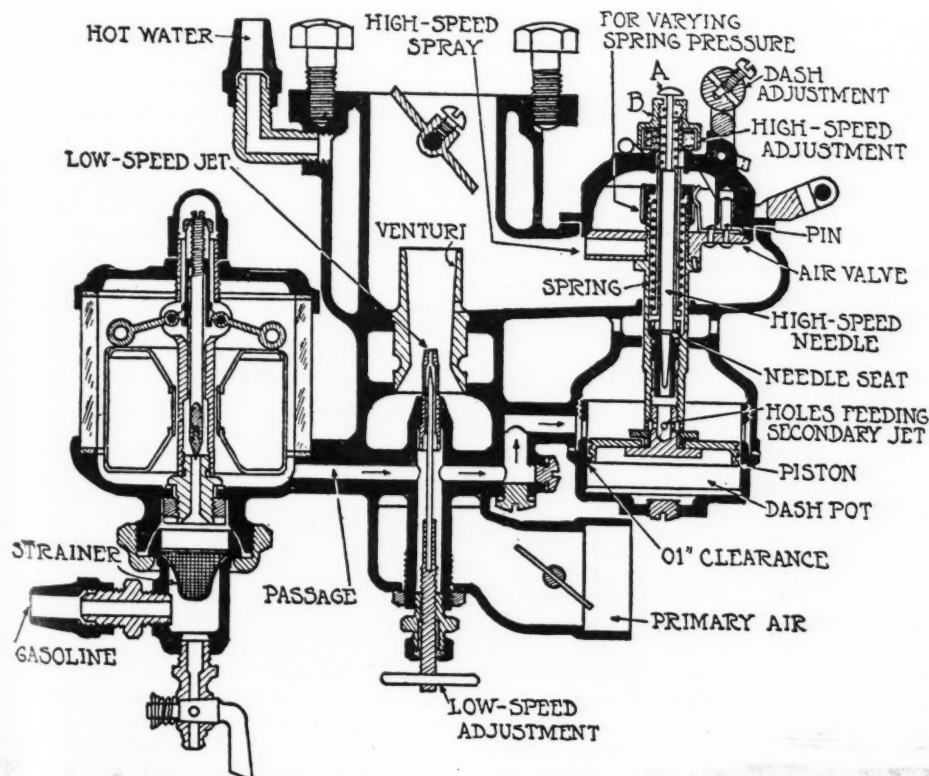
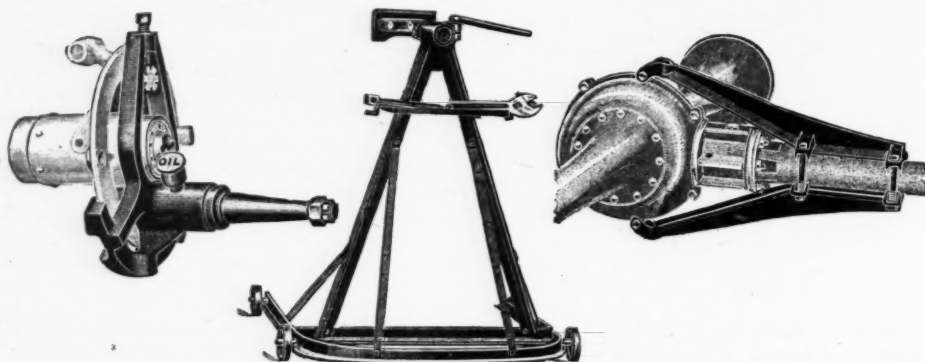
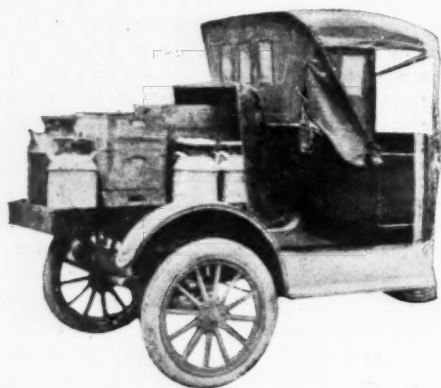


Fig. 7—Reference to this cross-sectional drawing demonstrates the adjustment of a Stromberg carburetor

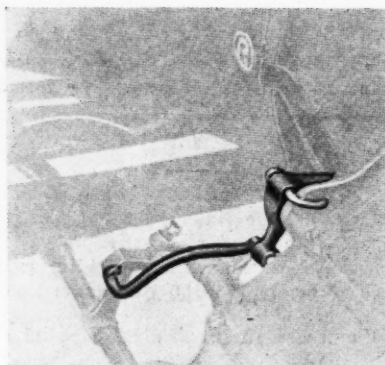
# The Accessory Corner



Three Ekern Ford products; left to right, emergency axle stub, engine stand and support for driveshaft tube



Ever-Ready attachment with the end gate raised and the car a truck



Noble safety brake, which operates automatically with the emergency

## Hiatt Manifold

THE Hiatt manifold differs from the Ford manifold in that it has a hollow pipe on the inside of the body. This hollow pipe takes air from the outside, which combines with the water vapor coming from the radiator through the small copper pipe. The mixture, passing through the pipe, is superheated due to the exhaust gases passing around the internal pipe, and on collecting in the dome this superheated vapor-laden air becomes a gas which, when passed to the intake manifold and mixed with the gas from the carbureter, is ready to ignite on the smallest spark. Tests, carried on for more than a year, average from 26.7 to 32 m.p.h. on a Ford touring car with four passengers. In comparison with tests made on the same car without the manifold the average was 17.1 m.p.g. Tests made in zero have produced 25 m.p.g., it is said. The manifold is sold complete with all minor attachments for fitting to a Ford engine. Price, \$15. Hiatt Manifold Co., Indianapolis, Ind.

## Ever-Ready Truck Attachment

The Ever-Ready Truck attachment is designed to transform a Ford runabout into a 1000-lb. truck instantly without changing the appearance of the car when not in use as a truck. The inside dimensions are width, 27 in. and length, adjustable from 27 in. to 5 feet. The end gate raises and lowers at will. The attachment is built of

heavy, black iron and has a shipping weight of less than 150 lb. To attach no bolts or screws are necessary, and it takes about an hour's time to attach permanently, it is said. Ever-Ready Truck Co., Chicago.

## Kelsey Streamline Body

The Kelsey streamline body for Ford cars is 11½-in. longer than the regular Ford body, 5½ in. of which is between the back of the front seat and the rear cushion and the other 6 in. in the overhang from the rear axle. The body is made of heavy

gage pressed steel on a substantially constructed hardwood frame. The upholstery is extra high-grade artificial leather, with double-deck heavy spring-cushion rear seat, single-deck heavy spring-cushion front seat and curled hair throughout. The back of the front seat is protected against scratches by a scuff panel extending from below the robe rail to the floor. Each of the four doors has lap joints, concealed hinges, bumper lock and a flap pocket. The top is one-man, made of Never-Leak material. A complete set of curtains and dust hood is supplied. The windshield is slanting, double ventilating and can be tilted to any angle. Running boards are of wood covered with Lin-Rubber and molding is aluminum. A tire carrier is equipped to carry tire with or without rim. The body can be attached in about 2 hr., it is said, using regular Ford fenders, radiator, dust shields, body supports on frame, bolts, etc. The weight, complete, ready for shipment, is 800 lb. Choice of color includes standard black, maroon with black molding, royal blue with black molding. Price, \$195. Kelsey Wheel Co., Inc., Detroit.

## Mica Flake Lubricant

Mica flake lubricant is intended for mixing with oil or grease, thus preventing the film of oil from becoming destroyed or consumed quickly. It is said to completely separate the two metal surfaces of journal and axle. Mica flake builds up the low places and fills the surfaces worn irregularly, giving the surface a superficial finish and a degree of smoothness not to be obtained on the surface of the metals themselves, it is claimed, and hence makes less oil necessary in lubrication. This lubricant is put up in 1-, 5-, 10- and 25-lb. cans and 100-lb. sacks. The same company also puts out a mica tire powder which, the maker lists, is slippery, a non-conductor of heat, does not cake, prevents adhesion between inner tube and casing, is not affected by moisture. The powder comes in a 25-cent metal tube and a 15-cent heavy fiber tube. U. S. Mica Mfg. Co., Lytton building, Chicago.

## Some Fitments for the Ford

*Pick-ups from the Accessory Show*

**Ekern Ford Products**—Three Ekern products, among others, are designed specially for Ford work, the emergency axle stub, Ford engine stand and support for driveshaft tube. With the emergency stub it is claimed you can place a Ford with a broken axle shaft on wheels in less than 2 min. and pull the car in at any speed desired. It hooks under the flange on the axle housing and has a set screw on top which when screwed down holds the device firmly in place on the axle housing. The stand is built so the engine can be held securely in any position to suit the worker. The device is made of malleable iron and forms a support that eliminates all vibrations, which cause the drive-

shaft to crystallize and break. It can be attached in 10 min., it is said, fastening to the driveshaft tube and the lugs of the differential case. Kern Brass Mfg. Co., Flandreau, S. D.

**New Gray & Davis**—The new Gray & Davis starting-lighting system for the Ford is a 6-volt, two-unit. It consists of dynamo with regulator cut-out; starting motor, battery and battery box, lighting and starting switches, sprockets, chain, wiring—all apparatus necessary for installation. The dynamo is driven from a sprocket on the crankshaft by a silent chain of liberal width. The regulator cut-out regulates the dynamo output as well as acting as a cut-

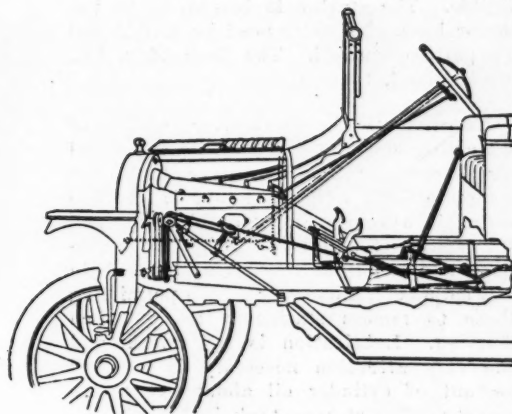
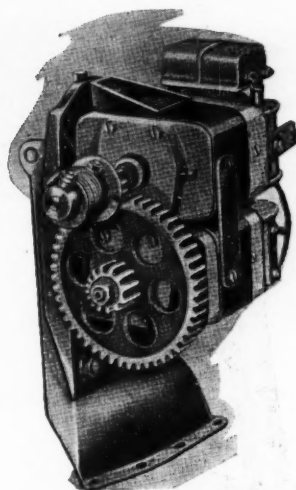


out. The battery is in a steel box and is automatically recharged by the dynamo when the car is running. The only part removed from the engine to install is the pulley on crankshaft, which is replaced by a sprocket. Price, \$85—Gray & Davis, Inc., Boston, Mass.

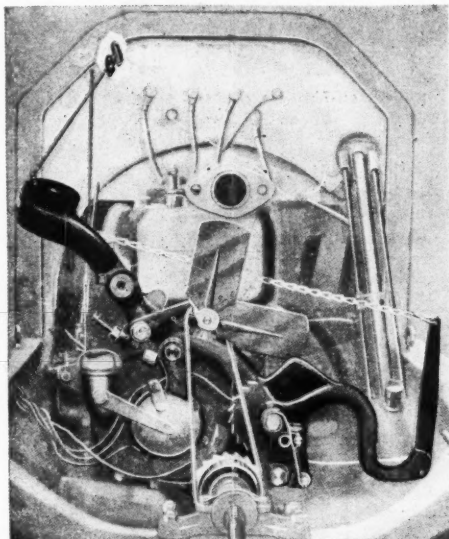
**Noble Safety Brake**—When the emergency brake is pulled the Noble safety brake automatically throws and holds the foot brake down until the emergency brake is released. As a result, it is claimed, the car can be left standing on any hill, or you can get out and crank your car on any grade, as it is held by a double set of brakes instead of a single set. Price, \$2.25—Hughes Mfg. Co., Chicago.

**Mathews Rectifier**—To utilize power wasted from the Ford magneto the Mathews rectifier has been brought out to change the surplus alternating current to direct. Enough current is saved, it is claimed, to keep a 6-volt battery charged. All the current is rectified and stored for service when wanted. The lights can be turned on even if engine is not running. The device is installed at the front of the engine and the usual Ford timer is replaced by an elevated timer in the instrument. At low engine speeds there is better firing, it is claimed, and steady bright lights. The rectifier, only, sells for \$17.50; rectifier and battery, \$29.50, while complete outfit with spotlight, wires, etc., is \$33. Consolidated Utilities Corp., Chicago.

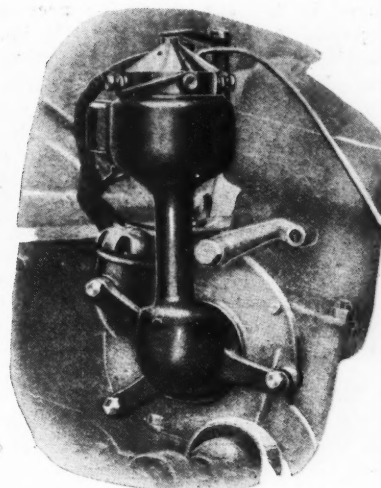
**Three-Power Lever Starter**—The Three-Power lever starter operates as the gear-shifting lever of center-control cars. To turn the engine a complete turn past two compressions, the movement of the lever is 20 in., as opposed to 53 in. with a hand crank. In addition to the hand lever a foot lever is provided also, which is operated with the hand lever. The starter also has a strong spring which is drawn out when the operator pushes the hand lever forward to engage the clutch, this making the third power. The device has no ratchets, pawls, cable or small springs to get out of order and weighs less than 30 lb. To install two small holes are cut through the footboard for the levers. A primer is provided and is located on the steering



The New Gray & Davis, left, for the Ford is a 6-volt two-unit. The Lanham starter, above, works on a three-power lever system



Installation of Simplex starter, which operates from the seat



Mathews rectifier, which changes surplus alternating current to direct

post between the spark and gasoline throttles. Price, \$18. Lanham Starter Co., Davenport, Iowa.

**Simplex Starter**—The Simplex starter is made of malleable iron and operates from the seat. A single pull instantly engages the crankshaft. The arrangement of the

pulley on the crankshaft is free from ratchets and bearings and is the only part of the starter that is running with the car. The device comes completely assembled, and to install only two bolts are required to attach it to the motor, no holes to drill or threads to cut. In combination with the starter is a safety device that prevents backfire, and a foot primer, or choker. Price, \$10. Simplex Mfg. Co., Anderson, Ind.

**Bear Starter**—This starter, illustrated in the issue of Aug. 9, is designed to start the Ford engine from the front seat of the car. Its predominating feature is the 3 to 1 gear, driven by a tapered drum, and the fact that it is placed under the hood independent of all of the working parts of the car. The drum revolves three times with each operation, spinning the motor a complete revolution over two compressions and past two ignition points, giving both leverage and speed. When the handle is pulled from the seat, the pull is transmitted by flexible cable direct to the drum which immediately begins to revolve at great speed and in an instant the second compression point has been reached, the motor has drawn in a full charge of gas and generated a hot spark. There are no corners or pulleys to work around, making the pull easy and wear on the cable neg-



Kelsey streamline body for Ford cars, 11½ in. longer than the regular body

ligible. The starter is bolted on to the motor base. No holes need be drilled and no parts disturbed. The Bear Mfg. Co., Rock Island, Ill.

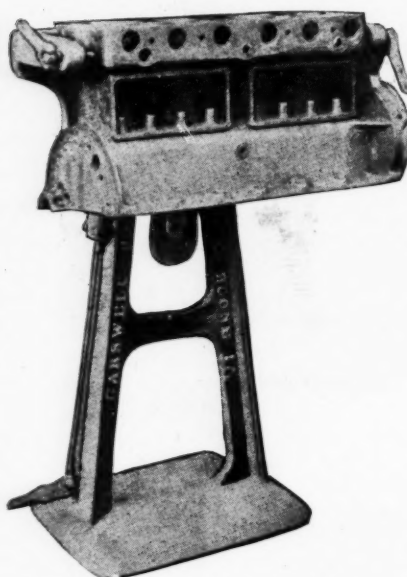
**Newstarter**—The Newstarter consists of a starting motor, a two-cylinder compound air compressor and a storage tank, the complete outfit weighing about 54 lb. The motor is a four-cylinder ball-bearing motor capable of delivering 10 hp. It is connected to and spins the engine by a chain and sprockets, a one-way clutch permitting these to remain stationary except when starting. Lubrication is by splash, and the only attention necessary is a small amount of cylinder oil about every two months. The storage tank is 7 by 30 in., made of welded steel, tested to 600 lb. and guaranteed to withstand a working pressure of 250 lb. An air hose is furnished to inflate the tires from the storage tank. To install no holes are drilled or are changes in the car or engine necessary. To operate it requires less than  $\frac{1}{4}$  hp. at normal speeds. Price, \$49; installation \$5 extra. Newstarter Mfg. Co., Chicago.

**Han-D-Dim Lights**—A light switch for Fords which fastens on the steering post in a convenient position giving full control of the lights is made by the Han-D-Dim Co., Chicago. The mechanism is so arranged that the lights will burn bright, dim or be switched off. The price is \$2.50 and the device can be installed in 5 min., it is stated. No change is necessary to the Ford lighting system.

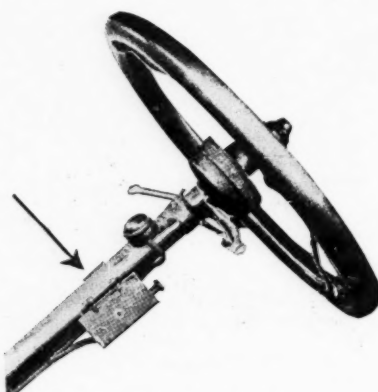
#### K-D Lamps

Model No. 6 electric head lamp, made by the K-D Lamp Co., Cincinnati, Ohio, is for 1915-16-17 Ford cars, and in addition a special K-D tail lamp assembly for Ford cars is produced by the company.

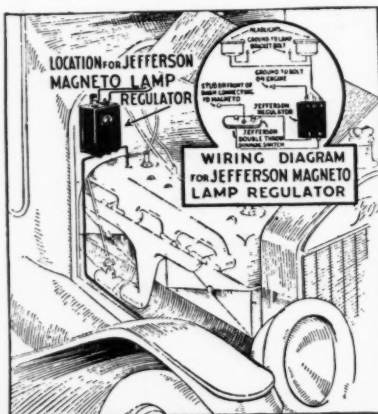
**Jefferson Lamp Regulator**—The Jefferson Electric Mfg. Co., Chicago, makes a magneto lamp regulator for Ford cars to operate all the lights electrically. It is claimed that the lighting efficiency is increased greatly and headlights will not burn out at high engine speeds. The device is mounted under the hood on the engine side and uses 6-volt lamps with instant dimming feature, operated by switch. By reversing the blade of this switch, the lamps will burn to full candlepower. With the Jefferson regulator the lights are wired in multiple, so that if one goes out the others are not affected. It is said that the regulator in no way hampers the successful operation of the ignition. It is possible for the owner to have a 6-volt battery interchangeable with the regulator, the battery current to be used when the engine



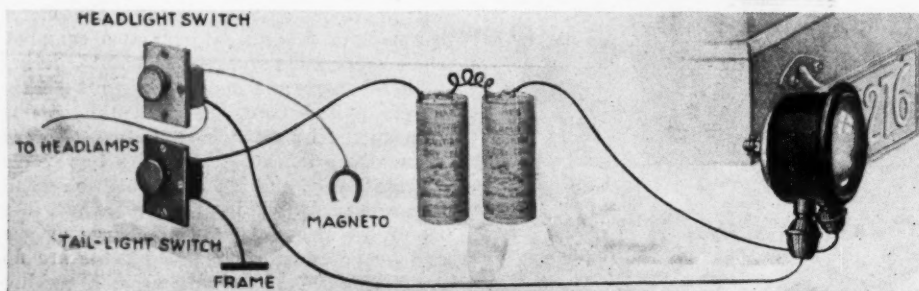
Carswell-Hammond stand for repair work on Ford engines



Han-D-Dim light switch, which gives steering wheel control



Installation and wiring diagram of Jefferson magneto lamp regulator



Special tail lamp assembly of K-D system for installation on a Ford car

is not running. A double throw switch is provided for this. The regulator is assembled in a steel case and weighs but  $2\frac{1}{2}$  lbs. It has no moving parts. Wiring diagrams accompany each outfit. Price, \$2.50.

#### Carswell-Hammond Motor Bench Stand

This motor bench stand is constructed for the Ford engine to speed up repair work. It is made entirely of metal and the table can be swung into various angles so that grinding valves, tightening bearings, etc., can be accomplished easily. A locking device is fitted to retain any given position of the table. The weight is about 150 lb. and the price is \$35. Carswell-Hammond Mfg. Co., Boone, Iowa.

#### Willard Superheater

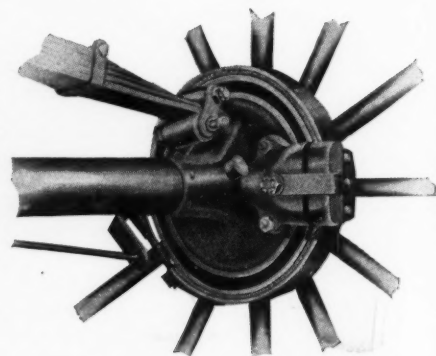
The Willard superheater is used with the standard manifolds and carburetor. It is of cast iron and fits over the exhaust manifold, being held in place by two straps which slip under the bridge clamps. A flexible aluminum tube conducts the superheated air to the throat of the carburetor. The tube is connected with the carburetor by an elbow and fastened with a set screw. Protected openings on top of the superheater admit the cold air. To compensate the difference in winter and summer temperature, an additional cold air intake is provided. For hot weather the metal cover is removed to admit more air. The device can be installed without cutting or drilling. It can be attached in 10 min. with an ordinary crescent wrench, it is claimed. Price, \$5. Willard Co., South Bend, Ind.

#### Sprague Worm Steering Gear

The Sprague worm steering gear is designed to eliminate jerky, insecure movement in the steering wheel, and with this device, it is claimed, the front wheels cannot cramp and no rut or other road obstruction can wrench the wheel from the hands. The 1918 model is ball bearing with a floating shaft, which permits the device to be attached even if the steering rod is twisted or out of alignment. To install, the standard equipment first is removed. The device fits in its place and is fastened securely by bolts without boring holes. No adjustment is required, and the only attention necessary is occasional oiling, which is done by removing a screw. Price, \$15. Sprague Mfg. Co., Omaha, Neb.

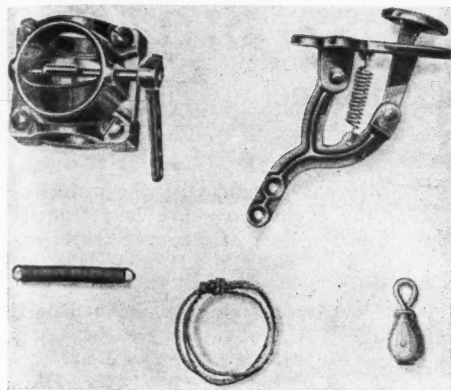
#### Master Brake

Control of the Master brake is through the regular foot pedal and emergency lever. The Master radius rod braces, which come with the brake, double the strength of the radius rods and tend to



Master hub-drum service brake, controlled through foot pedal and emergency





Cut-out assembly produced by American Machine Products Co.

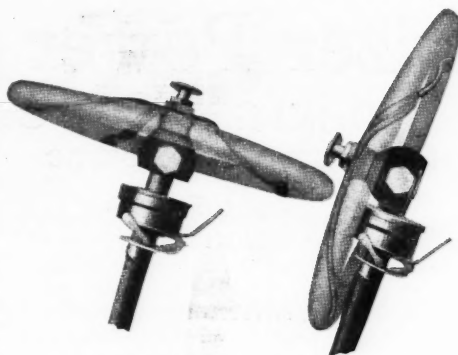


Willard super heater installed over exhaust manifold

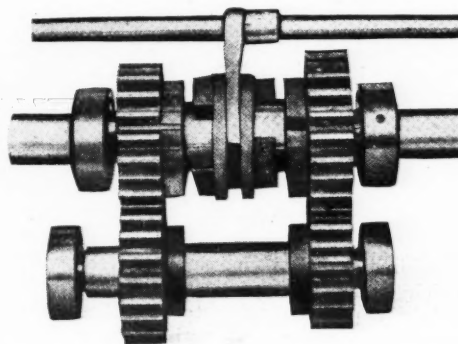
distribute evenly all braking stresses as well as eliminate rattle and vibration. The device is a hub-drum service brake that puts the strain on the rear wheels. It makes use of the regular rear wheel brake drum, giving 60 sq. in. braking surface. Price, with radius rod braces, \$22.50—Master Equipment Co., Los Angeles, Cal.

**Sprague Safety Crank**—The Sprague safety crank is to render cranking safe from back-firing or early explosions. It replaces the Ford equipment and can be attached by the average Ford user in 5 min., it is said. Price, \$5—Sprague Mfg. Co., Omaha, Neb.

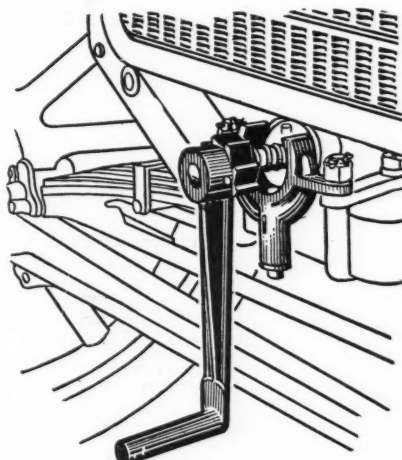
**Crump's Auxiliary Transmission**—This is an auxiliary gearset furnished complete with driveshaft ready to install on the Ford car. The gears are always in mesh, eliminating stripped gears. The low speed, which is lower than the Ford's, is used to advantage in starting a load on a hill or in mud, etc. The intermediate or third speed saves racing the engine when traveling slowly as in traffic. It also obviates the necessity of holding the foot on the clutch or low speed pedal when running slow. The overdrive is said to save gaso-



Prestotilt flexible attachment for the Ford steering wheel



Crump auxiliary gearset, which comes complete with driveshaft



Sprague safety crank to prevent back-firing installed

line and wear on car by lessening the vibration because of higher gearing. The intermediate of the overdrive gives a gear ratio between regular high and low. The gearset sells for \$75. L. & B. Truck Mfg. Co., Los Angeles, Cal.

**Flexible Tilting Attachment**—Prestotilt is a flexible tilting attachment for Fords, easily applied with a wrench only, it is claimed. The device is made of high-grade steel and is design to be rattle-proof. By lifting a button in the center of the wheel the wheel can be tilted. Prestotilt Attachment Co., Muncie, Ind.

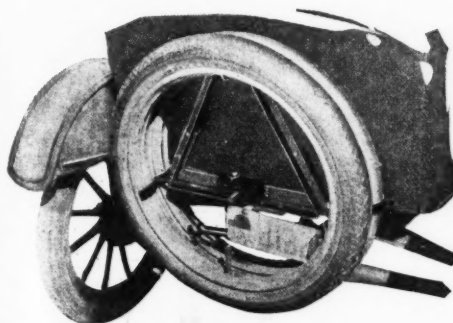
**Elka Tire Carrier**—The Elka tire carrier for Ford cars is for rear or side construction. It is fitted with Yale pattern four-pin tumbler locks, no two keys for which are alike. No straps, chains or other contrivances are necessary, attachment being made to the steel frame of the car by clamps with lock nuts. The carrier is made of 1 and 1½-in. angle iron, black enameled, and weighs less than 20 lb. Price, \$6—Elka Mfg. Co., San Francisco, Cal.

**Lewis No-Jar Clock**—This clock, which fits on the Ford steering wheel, is encased entirely in black rubber which is said to absorb all road shocks. The heavy rubber casing fits firmly about the clock, leaving only the face exposed. To attach it, the nut on top of the steering wheel is removed and as the rubber holder is movable on the metal base it can be attached at any angle. The price is \$2.50. Pennsylvania Rubber Co., Jeannette, Pa.

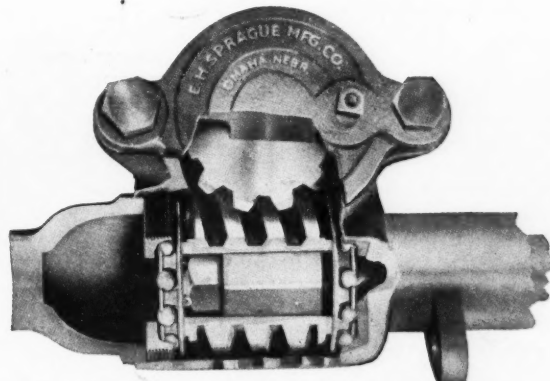
**Ampeco Cutouts**—The American Machine Products Co., Marshalltown, Iowa, also makes a cut-out assembly including cut-out valve, pedal, spring, pulley and 2 ft. of cable. The cut-outs are installed by cutting a V-shaped opening in the exhaust pipe and clamping the body of the cut-out around it, holding it in place by four bolts. The cut-out pedal is self-locking.

**New York Clutch Control**—The New York clutch control allows the Ford to coast by making possible a fixed neutral position of the clutch. It is installed by removal of two bolts on the Ford frame and requires no drilling or machine work. It has a locking catch which holds the clutch in neutral until released by pressure on the heel pedal. Price, \$3. New York Coil Co., New York.

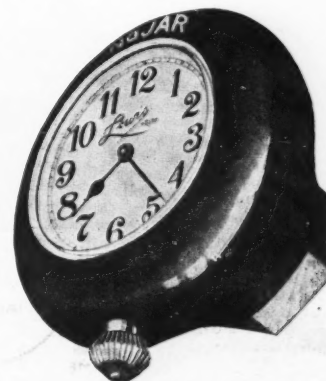
(Continued next week)



Elka tire carrier is for side or rear construction



1918 Sprague worm steering gear, ball bearing with floating shaft



No-Jar steering wheel clock

# Holley Vaporizer Power Loss Small

## Improvements in Detail Give 88 Per Cent Gasoline Efficiency on Kerosene

ONE of the most important points brought out at the recent tractor demonstrations at Fremont, Neb., was the fact that all of our manufacturers engaged in this line have not succeeded in grasping the principles underlying the successful use of kerosene. In view of the fact that the Holley kerosene carburetor as used on the Ford tractor has been in use in small quantities on two different types of engines covering a period of two years, some of the underlying features of this device will be of interest. It might be stated that as a result of the performance of this instrument during the experimental period, about 15,000 are now in process of manufacture. The British Government, after having made a series of tests on different types of instruments, has specified this vaporizer on four different tractors, and a factory has been built in Coventry to take care of the production in Europe of this vaporizing system. The Ford tractor is the only American-made tractor of the four, the other three being British.

### Shunts Heat Differently

Probably the most notable point of departure of this system from the practice followed in other devices is the method used for shunting the heat, which enables the efficient use of the different fuels under different temperature conditions.

Another point which should be noted in the Holley system, which is here described, is the use of the thin-walled brass tubing for vaporizing the fuel. This is made as light as it is commercially possible to obtain it, and by the rapid flow of heat possible through and around this thin tubing it is feasible to use one float chamber and to shift from gasoline to kerosene in from 15 to 30 sec. after starting.

One of the questions which continually is being raised is whether it is possible or not to use the present type of engine with kerosene; that is, must the engine be entirely redesigned or is it possible to use the types which we have de-

veloped for gasoline, except that kerosene is employed for fuel? It has been the experience of the Holley company that slight alterations are necessary. The compression can vary from 45 to 70 lb. absolute, according to the efficiency of the radiator and the thoroughness with which hot spots are eliminated. On the average engine as designed today, a compression of about 55 lb. represents what can best be used with kerosene.

While the system constantly is being improved as to brake horsepower, at the present time there is a loss of 11½ per cent in maximum output as between the standard gasoline carburetor and the kerosene carburetor. On the other hand, the pounds of fuel per brake horsepower hour in actual use is generally a little better with the kerosene vaporizer than it is with the gasoline carburetor. The factors recognized in the drop in maximum horsepower, which totals 11½ per cent, are approximately 7 per cent, due to slightly lower compression than used with gasoline and 4½ per cent because of the higher mixture temperature.

The amount of loss is being cut down gradually as improvements of the device are perfected, and these losses can be reduced also by the connection of either an air washer, water injection, an exceptionally efficient radiating system, or by a combination of all three.

Regarding the uses of water injection, of which much has been told during the last few years, it has been found that in practical service the result of water injection is to provide a cooler engine and one which does not show the effects of carbon so readily as when the water injection is not used. According to George Holley, when the water injection is employed the indicator card of the engine undergoes a change in characteristics, particularly in that the initial, or explosion, line does not go up so high as

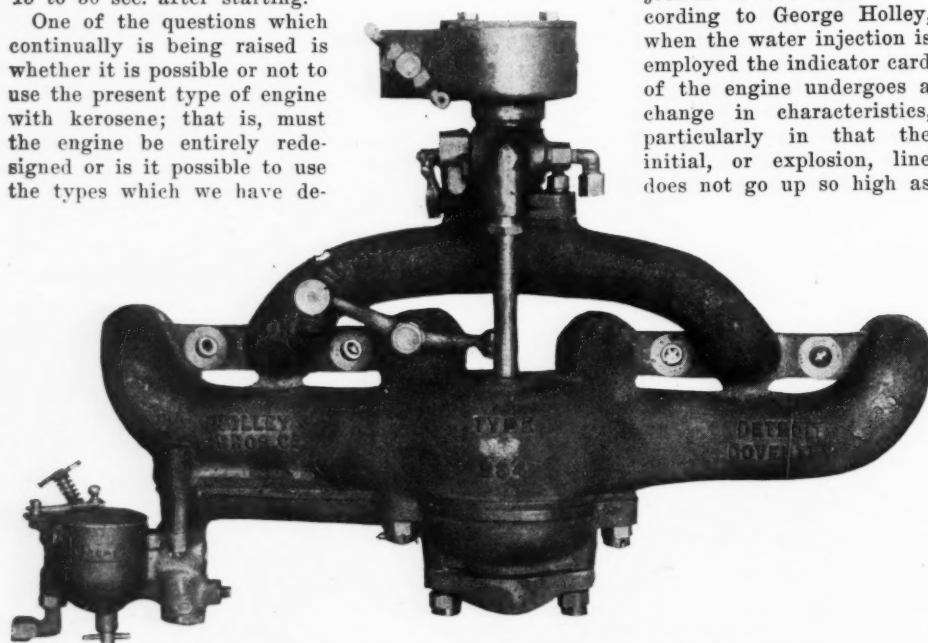
with a dry charge, and with the water injection the expansion curve is fatter, so that while the area of the card representing the useful work is not materially altered, if it is changed at all, the engine nevertheless is operating under conditions which make it less affected by carbon, thus reducing the tendency to knock and, correspondingly, giving more uniform bearing pressures during the work stroke without the hammering tendency which might otherwise be apparent.

The primary principle behind the design of the Holley kerosene vaporizing system is that it is possible efficiently to handle kerosene once it has been vaporized completely beyond the point where there is any tendency for it to collect; that is, where there is no tendency for minute invisible globules of the heavier products to collect into larger globules, which would tend to present to the influence of the heat of combustion a small superficial area in comparison with volume, thus rendering the mixture in a condition where cracking of the fuel will take place, and combustion generally be inefficient. Experiments conducted by the Holley company bear out the fact that once the kerosene has been vaporized thoroughly and mixed with a sufficient quantity of air to take the vapor by heat applied in the proper manner, it is possible to carry the charge several feet without experiencing the phenomena of collection commonly called condensation.

### How Holley Works

In studying the description of the device, it will be seen that Holley takes the kerosene and puts it into the proper vaporized condition by mixing it with the correct percentage of air to take care of the kerosene vapor after it has been formed, and by heat applied in a progressive degree converts this primary mixture of kerosene and air into a mixed vaporous condition, which avoids the difficulties due to collection of the heavy fuel globules. This principle, borne out in practice, is shown by the fact that this system is applied to engines where the manifold and intake gallery are of considerable length. If the kerosene were not vaporized completely, the long intake would be incompatible with good combustion, because of the tendency for the conglomerate products with a high boiling point to collect and interfere with efficient combustion.

The laymen in the shape of the farmer using the tractor, or the truck driver, or any of the other members of industries not closely allied with the automotive trades, have a very reliable check on the performance of the kerosene vaporizing systems in the simple expedient of watching for smoke. The smokeless combustion of kerosene is wrapped up very intimately with the perfected vaporization of the mixture. A mixture which collects before combustion is a smoke producer; one that enters the cylinder in a vaporous or semi-



Holley kerosene vaporizing system with one float bowl for kerosene and a shunt valve to regulate the amount of heat at which the vaporizing coil is exposed



gaseous condition will not smoke. The fact that the Holley vaporizers used in connection with the Ford tractors during the experimental period which has been going through on these machines work without producing smoke is illustrative of the advantage of a complete pre-vaporizing system.

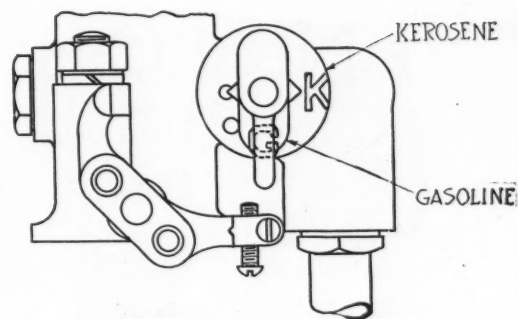
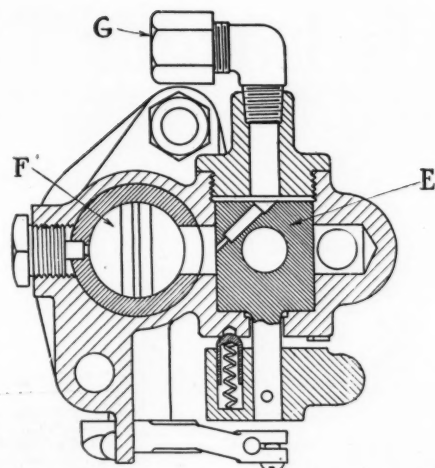
On the particular type to be described there is but one float chamber, and this is for kerosene. The gasoline for starting is admitted by a mixing valve, or jet, which is only in operation for a short time and which corresponds very closely to the choke tube used on gasoline carbureters for starting purposes. The kerosene enters the float chambers and is controlled by an ordinary type of float mechanism.

From the float chamber the kerosene passes through an orifice controlled by an adjusting needle valve to the top of the jet, where it is atomized by approximately 10 per cent of the total air required for combustion. This action of atomizing is done by the ordinary type of spray nozzle, the air being induced by the suction of the engine.

#### Passage of Mixture

The mixture of atomized fuel and air is then drawn through the vapor tube, A, situated in the heater chamber of the special exhaust manifold, B, where the fuel is vaporized in its passage through the coiled tube. The relatively rich mixture is heated progressively higher in temperature in its passage through the vapor tube, and by applying the heat at progressive stages, deposits due to decomposition products are avoided.

The temperature of the rich vapor can be regulated by the shunt valve, C, C; controlled by the lever, D, whereby more or less of the hot exhaust gases can be caused



Sectional views through two-way valve, showing how change is made from the gasoline for starting to kerosene for running

to come into direct contact with the vapor tube, thereby compensating for variations in fuel or operating conditions, such as a cold, wet day and a dry, hot day.

From the heater chamber the vapor tube issues and is connected through the shifter valve, E, to the venturi tube situated in the mixer chamber, F. The shifter valve, E, will be described more fully later.

At the venturi tube the rich vapor is diluted with the additional relatively cold air required to form a combustible mixture. In other words, this is the point where the action of the ordinary carburetor is parallel quite closely, with the exception that instead of gasoline, fuel and air being mixed, a relatively rich mixture of fuel plus 10 per cent of the necessary air is admitted in place of the fuel alone, and in addition the other 90 per cent of the air required is supplied. The addi-

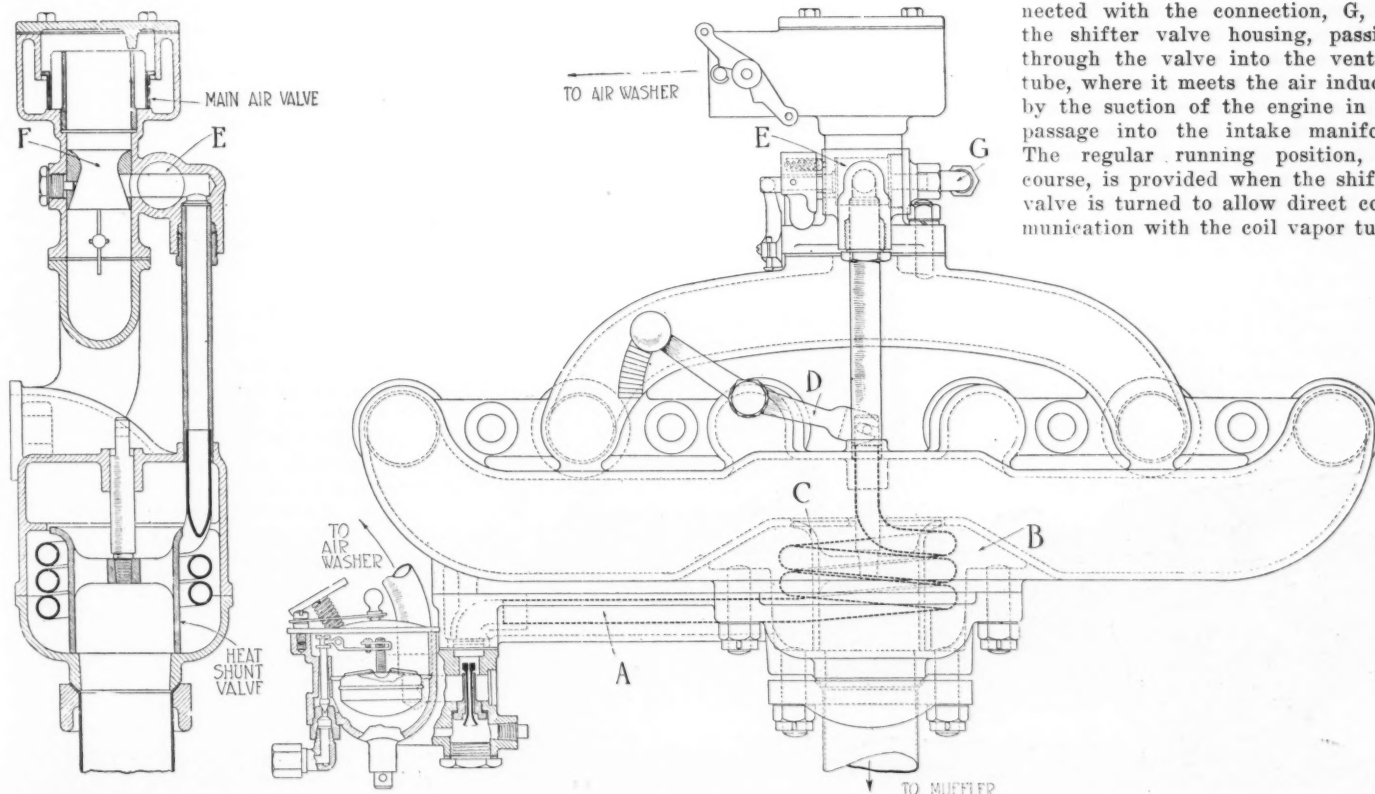
tional air required is admitted through a special form of air valve which governs the air admitted in accordance with the throttle position and requirements of the engine.

After the mixture of rich vapor and cold air has taken place the combined mixture passes the throttle into the inlet manifold and thus enters the engine.

#### Two-Way Valve

The shifter valve, E, referred to performs a double function; in one position it serves for starting purposes using gasoline as fuel, at the same time closing off communication between the vapor tube and the mixer chamber. It is to all intentions a simple two-way valve which, in one position, allows the suction of the engine to fall on the starting generator in communication with the gasoline reserve tank, and in the other position is in communication with the coil vaporizing tube previously described.

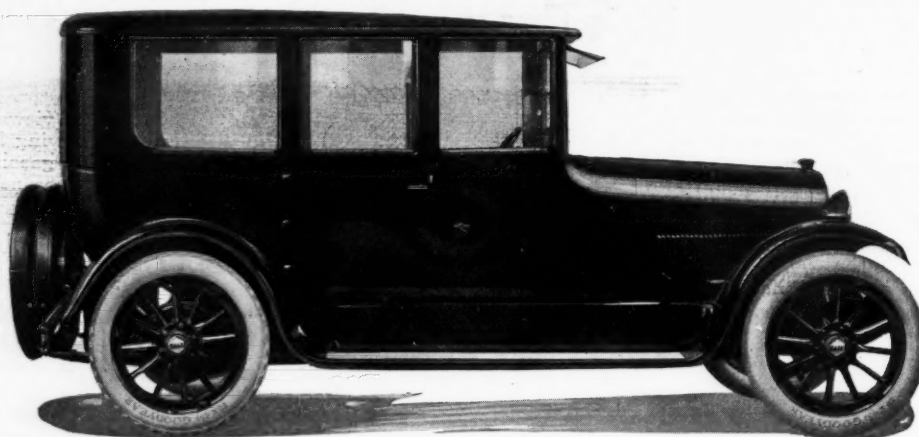
The gasoline for starting is supplied from a small auxiliary tank connected with the connection, G, on the shifter valve housing, passing through the valve into the venturi tube, where it meets the air induced by the suction of the engine in its passage into the intake manifold. The regular running position, of course, is provided when the shifter valve is turned to allow direct communication with the coil vapor tube.



Sectional drawing of the Holley vaporizing system for kerosene; showing the method of conducting the primary mixture through the vaporizing coil and the method for controlling the amount of heat used to vaporize the primary mixture

# New Case Is Larger Throughout

Two More Cylinders, 125-Inch Wheelbase, Larger Tires, With Roomier and More Modern Bodies



Case all-seasons model, with its specially designed body of sweeping lines. The glass panels lower, converting car into one open with permanent top

A THOROUGH-GOING enlargement of the Case car in every respect characterizes the program of the J. I. Case T. M. Co. for 1918. Two cylinders have been added to the engine, 5 in. to the wheelbase, larger tires are fitted and roomier and more modern bodies are supplied. With all, the new car is some 400 lb. lighter than the smaller one of 1917. This also marks the abandonment by the Case company of the policy of building its own passenger car engines.

## Single Chassis

The new Six appears as a single chassis model of 125 in. wheelbase, and upon it are fitted three bodies; a seven-passenger, known as the family model, a four-passenger, called the sport model, and a Springfield type, called the all-seasons model.

A Continental 6-cylinder engine replaces the four-cylinder engine of the present series. Its cylinders are  $3\frac{1}{2}$  by  $5\frac{1}{4}$ , giving a rated horsepower  $8\frac{1}{2}$  greater than before, and a performance whose improvement may be expected to be even greater than would be indicated by the difference in official power rating. This is a block engine, equipped with Rayfield carbureter, Stewart vacuum feed, with 18-gal. tank

carried in the rear of the car, Westinghouse electrical equipment, in which separate units take care of engine starting, lighting and ignition. This is combined with a Willard 90-amp. hr. battery.

A 10-in. Borg & Beck disk clutch transmits the power to a Grant-Lees three-speed gearset, the latter fitted with S. K. F. double-row ball bearings. Two universals are employed in the transmission shaft, to the Columbia three-quarter floating rear axle, which has a reduction of 45-11 to 1, through a spiral bevel final drive.

In the new six, the Case company has abandoned the cantilever in favor of the underslung half-elliptic springs as the rear suspension. Spring eyes are equipped with anti-squeak bronze bushings for ease of maintenance. The steering gear is a Jacox, with 18-in. corrugated wheel. Taking of the drive by the full Hotchkiss method through the springs to the frame has resulted in an extra deep channel section of the latter. The frame measures 6 in. in depth.

Even though the new car is lighter than the older four and weighs under 3200 lb., the tires have been increased in size and, in fact, the new six, if anything, is over-

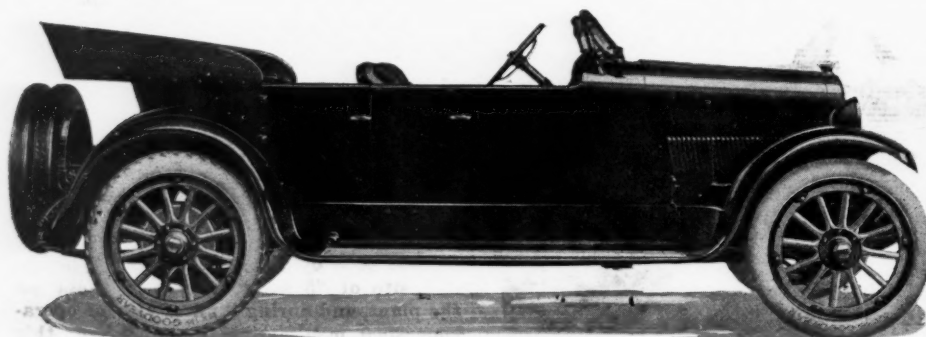
tired. Casings are 35 by  $4\frac{1}{2}$  in. and with this size should give exceptionally long tire life. These are fitted to Stanweld rims.

Air for tires is supplied by Stewart pump driven from the gearset, with the drive gears enclosed and running in oil. The Stewart speedometer likewise is driven from the change-speed mechanism and also operates in oil.

## Improved Appearance

In the appearance of the car as a whole there is very marked improvement, the whole design being modernized to the last minute. As compared with the four-cylinder, the radiator is taller, and the shoulders of the hood have been brought up to give the smooth, straight slope from radiator to cowl. The shield at the front of the radiator has been brought down to a decided inverted V, and the whole front is flatter and at the same time more graceful. The top of the body line from cowl to rear seat is horizontal and seat-backs in both the family car and the sport model project several inches above this line. The whole design gives a conception of comfort and speed which is enhanced by the decidedly sloping, folding windshield.

Rainy day comfort is provided by the use of curtains which open with the doors. When not in use, these curtains fold into the top. Marshall type cushions are among the comfort features. The interior furnishing of the car is comprised of mahogany paneling in the cowl board and in the rear of the front seat. Extra seats disappear into the backs of the divided front seats and are dustproof. Tonneau lights are arranged in the backs of the front seats. Headlights are of the double bulb type and are adjustable horizontally and vertically. Tire carriers are provided for either one or two spare tires or one wire wheel, and wire wheels on all models are supplied as extra equipment.



Case sport model for four passengers is the same as the seven-passenger mechanically, with the design of the body streamline throughout



Prices on the new six naturally will be higher than those on the smaller four, but the exact figures have not been made public as yet.

### CARS CHANGE EQUIPMENT

Chicago, Sept. 28—Various changes in design and equipment as well as prices have been made by cars during the last few weeks. The Owen Magnetic has increased its high gear ratio from 4.08 to 4.50 to 1. The car is driven through the springs on the large six, Model 0-36, instead of through the torque arm, and the voltage has been changed on both models. The voltage on the small six has been reduced from 24 to 14, while that on the large six has been increased from 24 to 28.

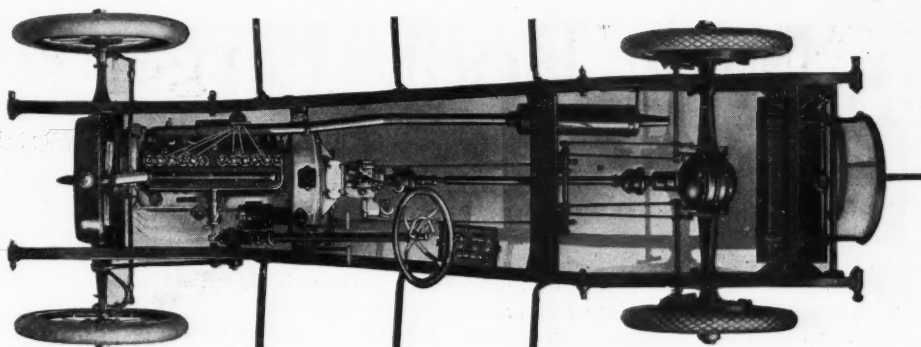
Other changes include the adoption of Connecticut ignition by Anderson. The Franklin has increased its gear ratio from 3.92 to 4.33 to 1. The Hatfield 950-lb. truck has adopted the Zenith carburetor. The Jones has changed its wheels from 35 by 4½ to 34 by 4. The Moon 6-66 has adopted the Warner gearset and the Moon 6-45 has increased its wheelbase from 118 to 125 in. Winton now is using its own gearset on Model 33. The Acme 1-ton truck has a new large engine, a Continental 3¼ by 5.

### G. M. CASH \$15,500,000

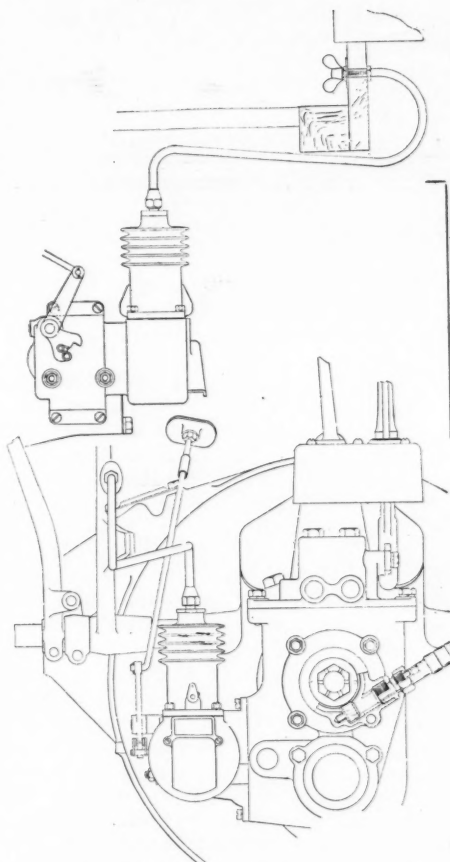
New York, Sept. 28—The General Motors Corp. has more than \$15,500,000 cash in the bank, plus \$1,000,000 of Liberty bonds, and nearly \$5,000,000 of sight drafts in connection with cars in process of delivery. In the fiscal year, beginning Aug. 1 and running up to Sept. 15, 2349 Cadillacs have been sold against 452 in the same period last year; 3740 Oldsmobiles, against 1074 last year; 16,039 Buicks, against 12,120 last year; and 829 trucks, against 316 in the same period of the last fiscal year. The company has 588 trucks finished and awaiting delivery to the Government. All cars and trucks of every description sold from Aug. 1 to Sept. 15 amounted to 27,071, against 16,963 in the same period last year.

### NEW YORK DEALERS GAMBOL

New York, Sept. 28—New York dealers drop work one day every year. This year it was Wednesday, and they played from morning to night on Fred Wagner's farm at Smithtown, L. I. More than 175 dealers drove down and helped eat the clam-bake, and most of them took part in the athletic program. Tickets were \$5 and entitled the holder to everything on the



Layout of chassis of new Case, which is fitted with a six-cylinder Continental engine and serves for all the 1918 models



Installation of tire pump and speedometer on Case, both of which are driven from the gearset

program and some things that were not. The whole affair was handled by a committee which arranged for the donation of all the prizes. The games consisted of a ball game with a silver trophy as the prize; a wheelbarrow race for which the

prize was two tire covers; two 50-yard dashes with a robe as the prize in one and an inner tube for the other; a gymkana with two prizes, a cup and dash-lock; a three-legged race with two thermos bottles for the winner; a sack race with a spotlight prize; a shoe race with a dash clock for the winner; a potato race which gave the winner a sweater; a tire-rolling contest which entitled the winner to a Perfection heater installed on his car; a crab race with a tonneau windshield for the prize; and a golf contest with a leather golf case as the prize. Poertner's Sea Lions encased in white duck uniforms and wearing camouflage in the form of whiskers beat Johnston's White Sox in a ball game, 14 to 3.

### 120 STERNS TUBES DAILY

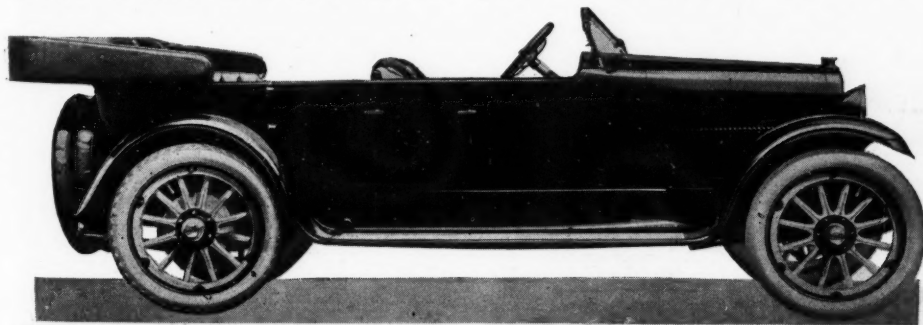
St. Louis, Mo., Sept. 30—William L. Burgess, president of the Sterns Tire & Tube Co., announced today that an output of 120 tubes had been reached at the factory here. This has been accomplished with machinery which has been removed here within the last few weeks from the experimental factory at Marion, Ohio, which has been closed. New machinery has been ordered to increase the output to 200 tubes daily by Dec. 1.

The Sterns Tire & Tube Co. was organized in this city two years ago by F. B. Sterns, inventor of the reinforced tube that attracted much attention by reason of the tests made for it. The company has been twice reorganized. In the second reorganization Mr. Burgess, formerly with the Goodyear Rubber Co. and later sales manager for the Dorris Motor Car Co. of this city, becomes president. Otto M. Mensing is vice-president and Charles K. Koch secretary-treasurer. The company is capitalized at \$1,000,000.

### \$5,000,000 PLANT FOR TIRES

Cumberland, Md., Oct. 1—An investment of \$5,000,000 is provided for in the final plans of the Kelly-Springfield Tire Co., Akron, Ohio, for the plant it intends to build here, instead of the \$2,250,000 factory mentioned in the early part of the year. The \$5,000,000 will be invested in improvements, buildings, machinery, etc., the manufacturing facilities now planned contemplating an annual capacity of over 400,000 tons of tires and similar supplies.

A site of 75 acres will be occupied by the plant, and during its first year of operation 3000 men are to be employed, this number to be increased to 5000 during the second year and to 10,000 later.



Case family model for seven passengers, built for durability, though the lines of the car are such as to make for beauty of car also

# New Body Lines for Stearns

## Mechanical Changes Mostly Refinements

**F**EW mechanical changes are noted in the new Stearns models, made by the F. B. Stearns Co., Cleveland, Ohio, and most of these are in the nature of refinements that render maintenance and repair easier. Though still distinctively Stearns in appearance, the new models are featured by a new and more complete line of bodies,

each characterized by the straight line design that is at present popular. The distinctive white bordered Stearns radiator has been retained, but by making the corner between the sides and top of the hood more marked, and carrying the edge and shoulder straight through to the back of the car, the snappy appearance of the car

has been greatly increased. And this is accentuated by an increased tilt in the windshields on the open models.

On the eight-cylinder model the oil circulating pump has been placed down at the base of the crankcase, instead of on the front of the eccentric shaft as formerly. In this position it is not necessary for it to lift the oil and the pump operates as long as there is any oil in the base.

The oil distributor unit on the eight-cylinder likewise has been cleaned up and simplified. An oil heating coil is still used, whereby the oil is by-passed through a copper heating coil in the water jacket. In cold weather, the oil is quickly heated to a proper running temperature on starting, and maintained at a more constant temperature during operation.

Instead of the concentrated arrangement of the instruments on the dash as was formerly used, the instruments are now distributed symmetrically over the instrument board. This was, and is, the practice on the four-cylinder model. Machined circular section connecting rods are no longer used on the eight-cylinder model, I-section rods being used instead. Though cast iron pistons are still used, they have been made lighter, and the wrist pins are carried on bronze bushings.

Both models now use the Stearns multiple disk clutch. Last year this was used on the eight-cylinder, but a leather cone clutch was used on the four-cylinder model.

On both models, the gasoline tank has been placed at the rear, instead of beneath the cowl as was the case last year. A Stewart vacuum tank is used to deliver the gasoline from the tank to the carburetor.

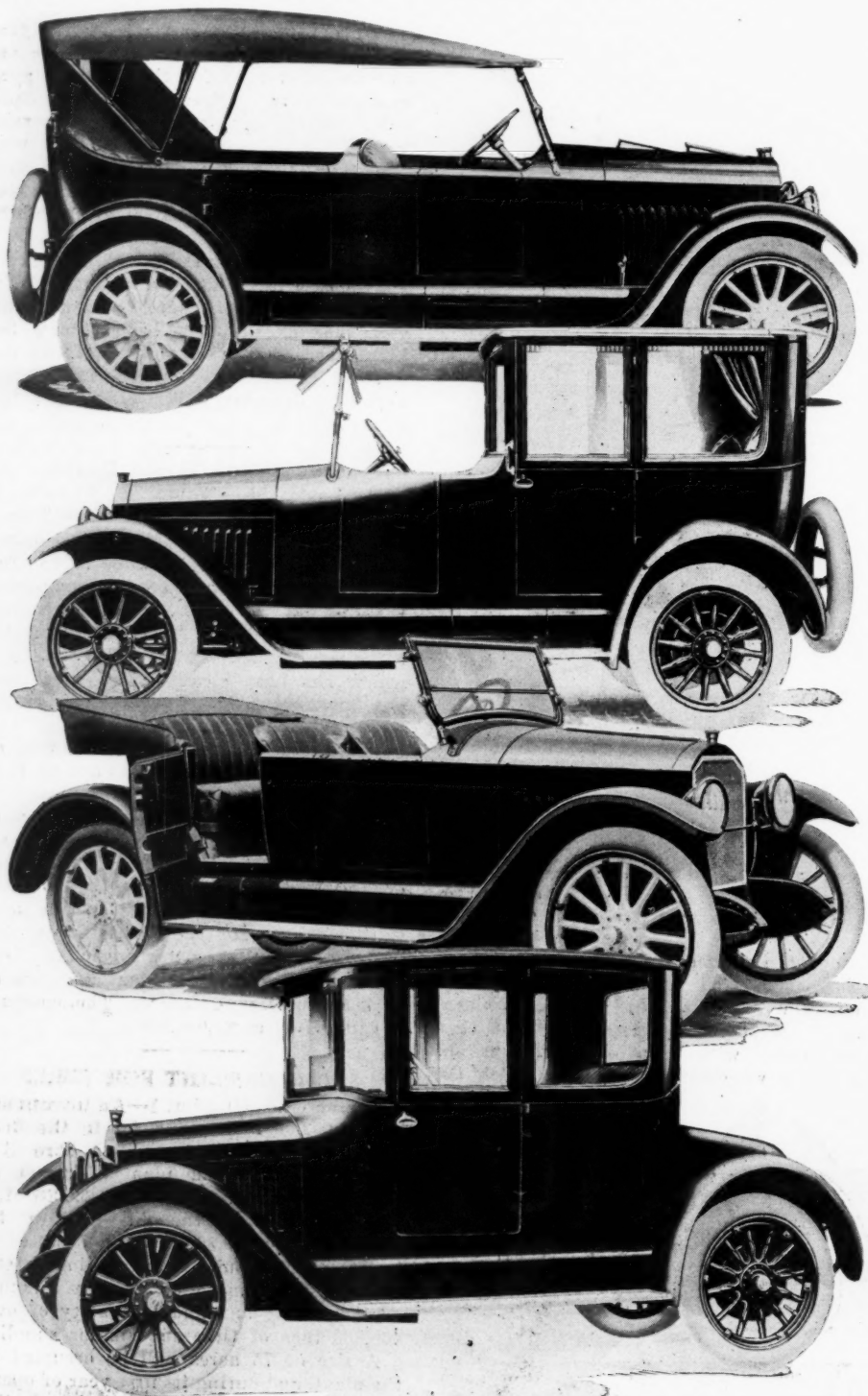
All tools are now carried in a special compartment in the door at the driver's side. This compartment is fitted with a lock, and provides a most convenient and secure place for tool storage. The tire carrier on all models is also new, a holder of the bracket type, riveted to the frame ends replacing the nest type formerly used.

### CLEVELAND PLOW CHANGES NAME

Cleveland, Ohio, Sept. 28—The Cleveland Motor Plow Co. has changed its name to the Cleveland Tractor Co. and plans to increase the capital stock from \$600,000 to \$6,000,000. Of this \$600,000 will be issued now, making \$1,200,000 outstanding. It is anticipated that the greatest part of the new stock will be taken by the present stockholders at par. Additions are being built which will give the company a capacity for 8000 tractors next year.

### TO MAKE SIMPLEX TRACTOR

Wichita, Kansas, Sept. 28—The Simplex Tractor Co. has been incorporated here with a capital of \$300,000 and will erect a plant and manufacture 1000 farm tractors a year. Many orders have already



THE NEW STEARNS BODIES—Above is the seven-passenger touring, next the town car, immediately below the four-passenger roadster and at the bottom the cabriolet



been received from various foreign markets. Incorporators include James P. Sullivan, O. D. Barnes, R. C. Fisher, W. McGill, C. Franks, F. O. Stone, I. N. Williams, Henry Bockelman and A. E. Alport. The Simplex tractor burns kerosene and uses one lever for control which has two forward speeds and one reverse.

#### EMERSON MOTORS REORGANIZED

Kingston, N. Y., Oct. 1—The Emerson Motors Co. has been reorganized as the Campbell Motor Car Co. and will produce a new car to sell at \$750. T. A. Campbell will be president and general manager, and the capitalization will be slightly less than \$2,750,000. It is said that more than 70 per cent of the old stockholders have agreed to accept one-third share of stock in the new company for one share of the old. It also is stated that present assets total about \$600,000.

The company now is operating at its Kingston plant and turning out about eighteen cars a week. About two-thirds of the parts to build 250 cars are on hand. All parts will be standard. The same engine will be used, and this will be built in Waltham, Mass., for the present. Other parts include a Salisbury axle and Muncie gear-set. The dealer organization built up by the Emerson company will be retained, it is said, practically intact, the list including about 225 dealers.

#### STANDARD CONTROLS AMERICAN

Cleveland, Ohio, Sept. 28—The Standard Parts Co. has acquired 100 per cent of stock of the American Ball Bearing Co. The deal is closed, but the price is not yet determined because the Standard Parts Co. is awaiting the valuation. The Standard Parts Co. will pay its own common stock at full value for stock of the American at its book value. The Standard Parts Co. common book value is understood to be a little over \$100 per share. Additional machinery is to be installed in the ball bearing plant.

#### OLYMPIAN BUYS MERIDIAN STOCK

Pontiac, Mich., Sept. 28—The Olympian Motors Co. purchased from the trustee in bankruptcy the Meridian Mfg. Co., Indianapolis, Ind., with drawings, patterns, forms, dies and materials for manufacturing the Olympian bodies, including materials for the new Olympian four-door roadster, and is moving this material with workmen to Pontiac, where it will manufacture all of the bodies for its cars and probably turn out twenty daily.

### McFarlan Body Types

ON this page are shown two views of distinctive bodies made under special orders by the McFarlan Motors Co., Connersville, Ind. This company specializes in out-of-the-ordinary body construction, as will be noted by referring to the illustrations, one of which is known as the Model 124 Destroyer design, a four-passenger touring job made for a Kentucky stock farm man and the other a seven-passenger touring body equipped with an extended Victoria top, and built for a Los Angeles man.

The regular seven-passenger touring

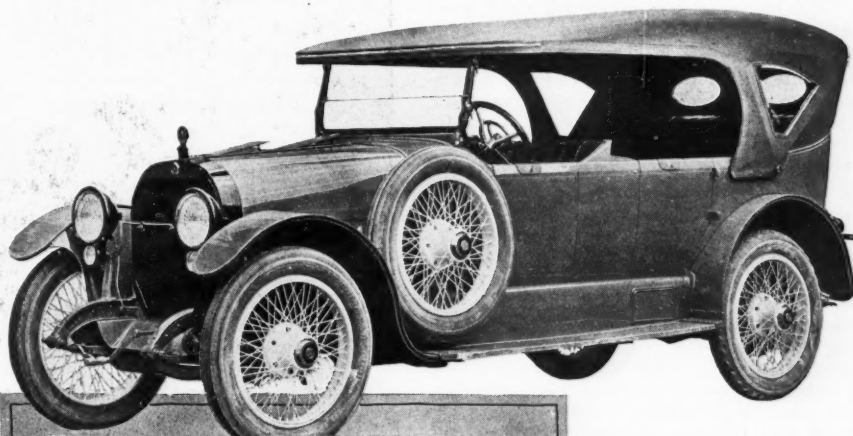
model has a number of pleasing features in addition to original design which gives a deep comfortable tonneau without appearing cumbersome. This model is equipped with cigar lighters, section lights, and thermos compartments.

In all, McFarlan comes in thirteen models, a two-passenger roadster, a four-passenger roadster, a four-passenger touring, a five-passenger, six-passenger and seven-passenger touring, a town-car, a seven-passenger cabriolet, two sedans, one with a sloping V front, and the other a straight front, a Berline, a limousine and a landaulet.

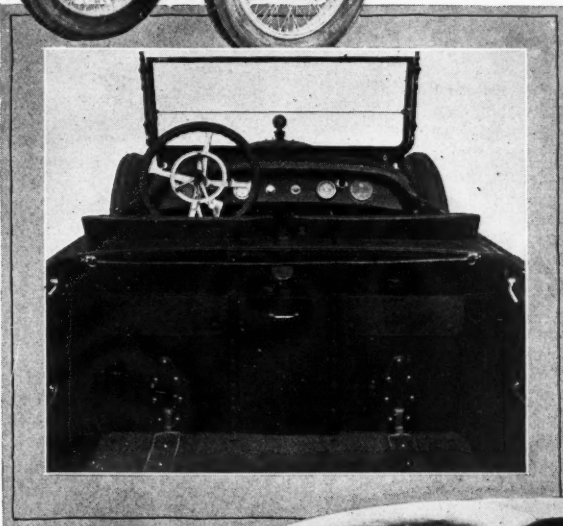
The regular McFarlan chassis known as the No. 90 to which both the open and closed bodies are fitted is equipped with

a 4½ by 6 Teetor-McFarlan six-cylinder engine rated at 90 hp. The carbureter is a McFarlan-Stromberg, two nozzle type, and fuel is taken through a vacuum feed system from a tank in the rear which holds 28 gal. Two separate systems of ignition—Westinghouse battery and high-tension magneto with separate plugs to each system—are installed in all models.

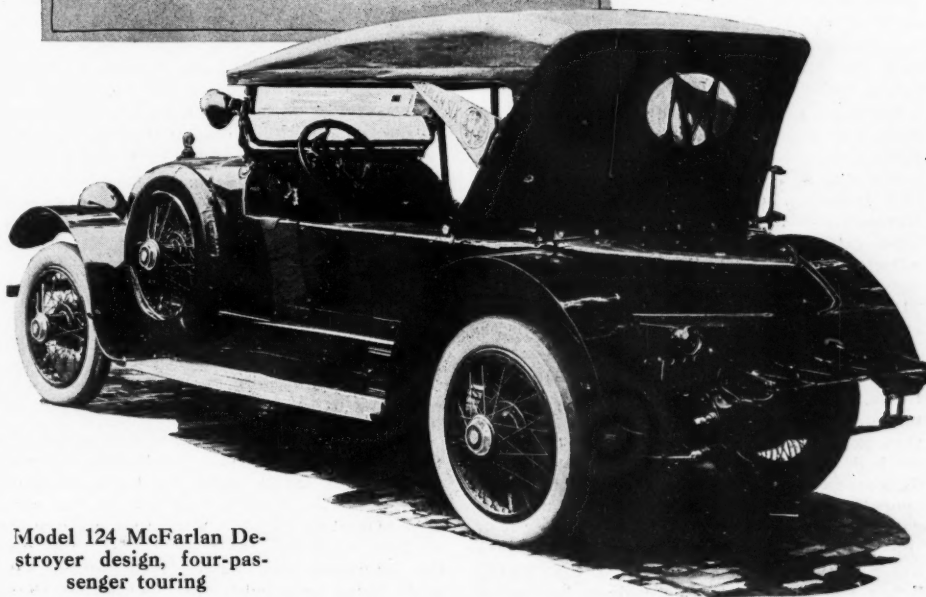
The clutch is a multiple dry disk and the rear axle a Timken floating with spiral bevel gears. Rear springs are McFarlan cradle, 2½ by 64 in. Wire wheels are optional at additional cost. The starting system is Westinghouse with the starting switch on the steering column, and a separate Westinghouse generator is used for lighting.



Above—Seven-passenger McFarlan with extended Victoria top



Left—Interior of the seven-passenger McFarlan shown above



Model 124 McFarlan Destroyer design, four-passenger touring

# Among the Makers and Dealers

## ROGERS Resigns to Join Army—A. J.

Rogers, advertising manager of the Nor-dyke & Marmon Co., has resigned to become a lieutenant in the United States army.

**Davey Leaves Chalmers for Bethlehem—**Roy C. Davey, advertising manager of the Chalmers Motor Co., has resigned to become assistant sales manager of the Bethlehem Motors Corp., of Allentown, Pa.

**Bayne to Represent Acason Truck—C.** William Bayne has been appointed special representative of the Acason Motor Truck Co. Mr. Bayne was formerly with the Ford Motor Co. as a special representative.

**New Studebaker Building for Philadelphia—**The Philadelphia branch of the Studebaker Corp. is building a new seven-story home, which will give it nearly 90,000 sq. ft. of floor space. Henri Neubauer is manager of the branch.

**C. F. Johnson Joins Johnson Co.—C. F.** Johnson has been appointed carbureter engineer for the Johnson Co. of Detroit. Mr. Johnson was formerly carbureter engineer for the Cadillac company, with whom he was connected for twelve years.

**Republic Brass to Expand—**The Republic Brass & Bronze Co., Pontiac, Mich., which is controlled now by the Precision Die Casting Co., Syracuse, N. Y., will erect additions to its plant and employ more men to take care of the Government contracts recently secured.

**Lurker Is District Sales Manager—**Edward Lurker has been appointed district sales manager in charge of the Chicago office of the Haynes Stellite Co. of Kokomo, Ind. The territory includes Wisconsin, Iowa, Minnesota and Illinois. Mr. Lurker has been at the home office as engineer.

**W. H. Kirkpatrick Working for Government—**W. H. Kirkpatrick, who for many years was general sales manager for the Peerless Motor Car Co., Cleveland, Ohio, is now in Washington, where he will manufacture an article for war purposes under contract with the government.

**Maxwell Retains Chalmers District Managers—**The district managers of the Chalmers Motor Co. have been retained by the Maxwell Motor Co. Thomas J. Tener, sales manager of the Maxwell company, addressed each of the Chalmers district managers at a convention, talking separately to each, and then making a collective address outlining future policies.

**Minnock to Manage Ford Branch—P. F.** Minnock, who has been manager of the Ford factory branch at Columbus, Ohio, has been made manager of the Des Moines Ford factory branch, succeeding F. B. Norman. Mr. Norman has gone into business for himself and taken the Ford city agency at Wilmington, Del. H. M. Barton remains as assistant manager at the Des Moines branch. The plant, which is under process of construction, will not be done for three months.

**Association to Make Driving Safer—**The Motor Accessory Trade Association, St. Louis, Mo., has undertaken a campaign to make safer the driving of motor cars in this community. Plans are to call attention to bad streets, complete the marking of dangerous corners and crossings and co-operate with the police in curbing reckless driving and punishing reckless drivers. At the first meeting the recommendation was made to the United Railways Co. that signal lights for right-of-way crossings be better



TESTING THE TRACTOR FOR ARMY—Cleveland tractor hauling a 5700-lb. load of lumber across creek bottom and going up 35-deg. incline in tests made for the Ohio regiment of engineers

attended to and that trolley poles in the middle of some streets where not protected by curbing be painted white.

**Booth to Manage Detroit Office—**W. A. Booth has been appointed manager of the Detroit office of the Standard Steel Tube Co. of Toledo, Ohio.

**Fisher Body to Add—**The Fisher Body Corp., Detroit, will erect a one-story brick and steel factory building adjoining its present plant.

**Moon Factory Expands—**The Moon Motor Car Co. has taken over the works of the Joseph W. Moon Buggy Co. The additional factory space and machinery insures the completion of 20,000 of the new sixes.

**Lavery Now a Lieutenant—**George L. Lavery, Jr., formerly manager of service stations for the Springfield Body Co., Detroit, has been commissioned lieutenant in the motor section of the Ordnance Department.

**Browne Gets Army Commission—**A. B. Browne, consulting engineer, New York, inventor of the Browne carburetor and part inventor of the Browne-Chase engine, has been commissioned captain in the medical corps, where he will be an inspector of ambulances.

**Dayton Rubber to Double Capacity—**The Dayton Rubber Mfg. Co. will be able to more than double its capacity by its new plant, which will be ready for occupancy the middle of October. Sales for the first six months of 1917 were greater than in all 1916, and the company has been supplementing its sales force until with the opening of three

new branches next month fifty or more additional salesmen will be employed during the coming season. The production of the Ford size of tires will be increased.

**Washburn to Manage Landover Truck—**A. L. Washburn has been appointed manager of the Landover Truck Co., Menominee, Mich.

**Security Tire to Build Plant—**The Security Tire & Rubber Co., Cleveland, Ohio, will build a plant at Wellington, Ohio, where it will manufacture its products. The company makes a tire that does not require inflation and is capitalized for \$1,000,000.

**American Brass Foundry Changes Name—**The American Brass Foundry Co., Milwaukee, Wis., has changed its name to the American Metal Parts Co. There will be no change in the policies of the firm, and there has been no change in the personnel except that S. A. Fulton has bought an interest and is now president. The entire sales of the company's products will be handled exclusively by the Fulton Co., Milwaukee.

**Petrograd Dealer Visits Detroit—**Arthur E. Corbin of the Russian Automotive Engineering Co., Petrograd, who was formerly assistant sales manager of the Packard Motor Car Co., is in Detroit. The Russian company with which Mr. Corbin is associated handles Pierce-Arrow, Hupmobile and Hudson cars and Hurlbut and Federal trucks. Mr. Corbin states that all business at the present time is with the government and that transportation is at a standstill. The company has 135 cars at the port of New York, where they



have been waiting for the last fourteen months for shipment.

**Federal Truck Promotes Soper**—E. P. Soper, manager of the order department for the Federal Motor Truck Co., has been promoted to become assistant sales manager.

**Winans Now With Federal**—E. W. Winans, who was formerly chief engineer for the Regal Motor Car Co., has been appointed service manager for the Federal Motor Truck Co.

**Duplex Truck Co. to Expand**—The Duplex Truck Co., Lansing, Mich., has a schedule providing for 300 trucks a month during 1913 and is erecting two factory buildings with 100,000 square feet of floor space to provide additional manufacturing facilities.

**Dann Insert Forms Canadian Concern**—The Dann Spring Insert Co. has formed a Canadian company under the name of the Dann Spring Insert, Ltd., at Hamilton, Ont., to manufacture accessories and parts for the motor car industry. The capital is \$40,000.

**War Takes Many Detroit Draftsmen**—There is a demand for draftsmen in many Detroit factories caused by the enlistment of draftsmen in Government work. The companies are seeking draftsmen who are not liable to be called by the war department.

**Crossman and Hoffman Are Promoted**—A. W. Crossman, who went to Los Angeles six months ago as branch manager for the Studebaker, has been promoted to manage retail sales nationally, with headquarters at South Bend, while Paul G. Hoffman, formerly in charge of retail sales at the Los

Angeles branch, has been appointed to succeed Mr. Crossman.

**Henry Liebner Dies**—Henry Liebner, manager of employment for the Buick Motor division of the General Motors Corp., died last week following an operation. Mr. Liebner was associated with the Buick company for the last eight years and knew practically every employee of the concern.

**Ecorse Foundry to Add Capacity**—The Ecorse Foundry & Machine Co. will build a 160 foot addition to its plant. The company intends to employ girls as coremakers and when in full operation anticipates the employment of 750 workers and the use of 200 tons of ore daily.

**Buick Adds to Plant**—The Buick Motor Division of the General Motors Co. is building a new warehouse and loading dock at a cost of \$500,000 which will greatly facilitate shipments. The company also is erecting a new office building which will be completed within the next ninety days.

**Willys-Overland Promotes Morgan**—George C. Morgan, manager of the Willys-Overland Toledo branch, has been promoted to the general branch department of the main plant. John Yoke, formerly assistant sales manager of the Smith Form-A-Truck Co., succeeds Mr. Morgan at the Toledo branch.

**Liberty Organizes in Canada**—The Liberty Motor Car Co. of Canada, Ltd., Windsor, Ont., has been incorporated by Percy Owen, president of the Liberty Motor Car Co., Detroit, James F. Bourquin and Harland M. Wirth, with a capital of \$10,000. The new in-

corporation was made to protect the name of the company in Canada and to insure facilities if the company desires Canadian business in the future.

**Pennsylvania Rubber Club Opens**—The opening of the new Wayfarer's Club was a feature of the recent annual conference of branch managers and sales directors of the Pennsylvania Rubber Co. at Jeannette, Pa. The club contains dining room, living room, kitchen, billiard room, etc., and the business sessions and luncheons were held there. The conference was in session three days.

## Recent Incorporations

**Blackwell, Okla.**—W. H. Clarke Motor Co.; capital stock, \$5,000; incorporators, W. H. Clarke, W. M. Wiggins and H. B. Spencer.

**Clovis, N. M.**—Quick Service Garage; capital stock, \$8,000; incorporators, Leander King, R. R. Bridges and B. H. Oxford.

**Dallas, Tex.**—Sattley Motor & Tractor Co.; capital stock, \$25,000; incorporators, C. A. Sattley, O. C. Stokely and Harry L. Manes.

**Detroit**—Super-Heated Carburetor Co.; capital stock, \$50,000; to manufacture carburetors, engines, tractors and other mechanical devices; incorporators, S. R. Du Brie, F. L. Sutherland and William H. Turner.

**Dover, Del.**—McCord Silent Sleeve Motors Co.; capital stock, \$200,000; to manufacture and sell combustion engines; incorporators, Edward A. Biggs, Edmund S. Carr and E. W. Kraft.

**Grand Rapids, Mich.**—Grand Rapids Auto Products Co.; capital stock, \$10,000; incorporators, H. C. Bennet, R. J. White, C. M. McCarthy and Arthur Post.

**Kalamazoo, Mich.**—Victor Wire Wheel Co.; capital stock, \$500,000; to manufacture wire wheels and parts for motor cars and aircraft; incorporators, Dwight Seymour, John F. O'Connell and Harry den Bleyker.

**Kansas City, Mo.**—Kansas City Battery & Supply Co.; capital stock, \$6,000; incorporators, Jacob L. Lederer, Eva L. Lederer and Louis L. Cumbler.

**Kansas City, Kan.**—Ever Ready Tire & Accessory Co.; capital stock, \$20,000; incorporators, Mae A. Cannon, Robert B. Cannon and C. L. Williams.

**Kansas City, Kan.**—Robert Cannon Motor Co.; capital stock, \$20,000; incorporators, Tena Kelley, Anna Kelley and C. L. Williams.

**Kansas City, Mo.**—Fessler-Jenkins Mfg. Co.; capital stock, \$7,500; to manufacture and deal in motor cars and accessories; incorporators, F. G. Hoffine, William L. Fessler and J. C. Jenkins.

**Lansing, Mich.**—G. S. & G. Machine Co.; capital stock, \$20,000; to manufacture motor car parts; incorporators, D. Greensbon, E. C. Greensbon and M. Schrager.

**Lansing, Mich.**—Lansing Ford Co.; capital stock, \$100,000; incorporators, J. J. Callahan, E. M. Refor and C. W. Nichols.

**Lansing, Mich.**—J. P. Marting Mfg. Co.; capital stock, \$50,000; to manufacture anti-skid tires; incorporators, J. P. Marting, G. A. Wright and F. E. Hood.

**Oklahoma City, Okla.**—New State Motor Co.; capital stock, \$20,000; incorporators, O. T. Remos, C. D. Lacey and Ed M. Seamans.

**Oklahoma City, Okla.**—Oklahoma Saxon Motor Co.; capital stock, \$20,000; incorporators, C. C. Davis, J. R. Oliver and R. A. Klefeker.

**Okmulgee, Okla.**—Travelers' Garage; capital stock, \$5,000; incorporators, A. H. Philbrook, Bessie L. Philbrook and F. H. Cott.

**Okmulgee, Okla.**—X. R. Gill Co.; capital stock, \$35,000; incorporators, D. M. Smith, Crittenden Smith and X. R. Gill.

**Port Arthur, Tex.**—Port Arthur Auto Sales Co.; capital stock, \$20,000; incorporators, E. P. Baker, George T. Craig, E. A. Mullin and C. T. Baker.

**San Antonio, Tex.**—McDaniel Motor Car Sales Co.; capital stock, \$25,000; incorporators, M. D. Connors, E. A. Shannon and E. A. Dunnahoo.

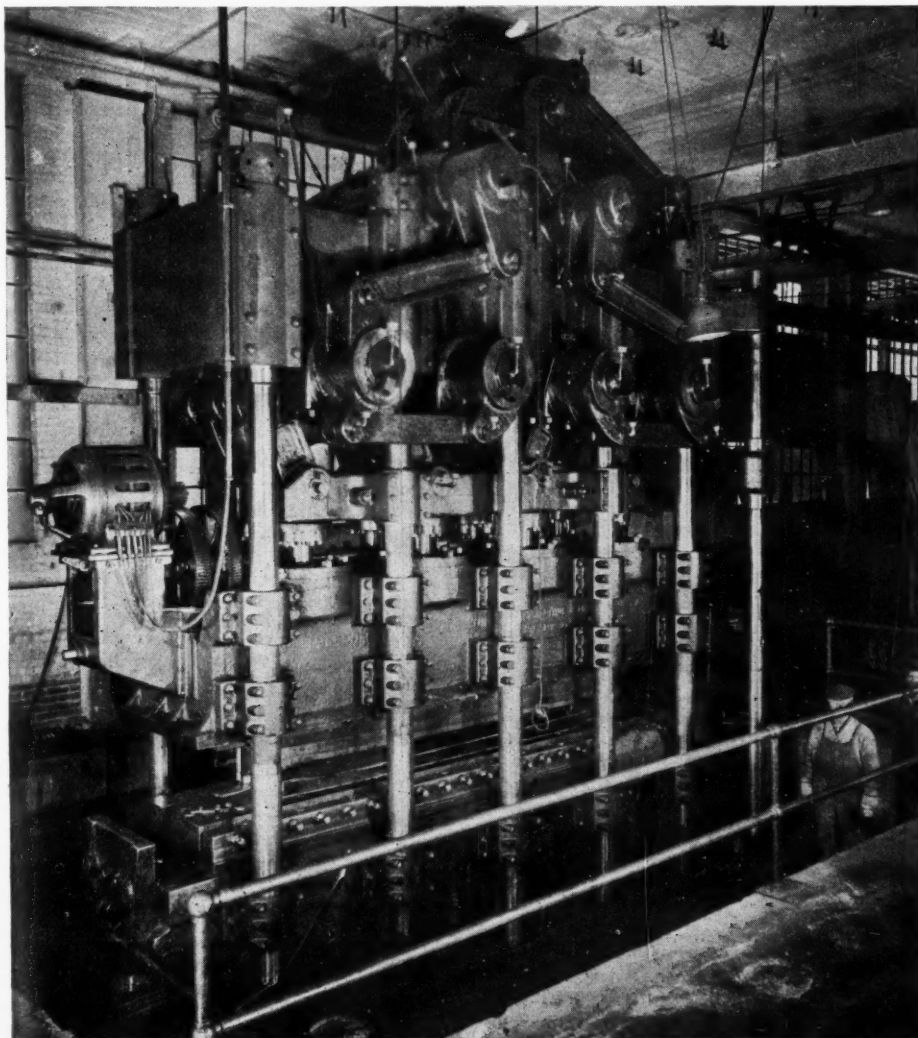
**San Angelo, Tex.**—Martin Reo Sales Co.; capital stock, \$12,000; incorporators, R. G. Hollingsworth, B. Martin, G. B. Bohannon and H. G. Martin.

**St. Louis, Mo.**—Independent Piston Mfg. Co.; capital stock, \$25,000; to deal in gas engines, motor cars, etc.; incorporators, Theodore Weinhaus, K. N. Matthews, Josephine Weinhaus and Norbert S. Weinhaus.

**St. Louis, Mo.**—National Auto Accessories Co.; capital stock, \$10,000; incorporators, A. H. Rawitzer, E. A. Rawitzer and James F. Lewis.

**Topeka, Kan.**—Topeka Buick Co.; capital stock, \$5,000; incorporators, N. V. Wood, C. A. Campbell and Mrs. Helen Hereford Wood.

**Tulsa, Okla.**—Mitchell Motor Sales Co.; capital stock, \$10,000; incorporators, B. M. Grotkop, Jack Albertson and Paul A. Wilson.



**WHEN MOLOCH DOES THE WORK**—This giant machine is called "Moloch." Every 15 sec. it turns out a side rail for Willys-Overland motor cars

# From the Four Winds



**CAMOUFLAGE YOUR CAR TODAY?**—Arthur Hurtt of Los Angeles is seen here camouflaging his Velie. It takes less than an hour to do a complete job and the car can scarcely be seen at a quarter mile, it is said

**COLORADO Licenses 62,365 Cars**—A compilation issued by the secretary of state today shows there are 62,365 motor cars in Colorado. Denver county has the largest number, while El Paso is second with 6494; Weld, third, with 4472, and Pueblo, fourth, with 3030.

**Briscoe Reports 26 m. p. g. on Trip**—The Briscoe Motor Corp., Jackson, Mich., reports that the trip made by Charles F. Hopkins, Jr., in a new stock Briscoe from Jackson, Mich., to St. Augustine, Fla., was made with an average of 26.7 m. p. g. The distance is 1297.7 miles.

**Bloomington, Ill., Club Stages Show in Open**—The Bloomington Automobile Trade Association and McLean County Automobile Club planned something new in the way of shows when they decided to hold a two-day open air show on the public square, Oct. 5-6. Entries were full quite a while before the event.

**Des Moines to Show Closed Cars**—Des Moines, Iowa, dealers will hold their first annual closed car show the week beginning Oct. 22. The show will be under the auspices of the Des Moines Automobile Dealers Association and Dean Schooler and C. G. Van Vliet, who manage the annual winter show, will have charge. Each dealer will hold open house until 10 o'clock at night.

**St. Louis Dealers Want Show Building**—The Automobile Manufacturers' and Dealers' Association, St. Louis, Mo., is looking for suggestions as to the location of the next motor car show. Last spring's show was held in the new Overland building, then just completed. This building will not be available next year, and no building in the course of erection now appears to be suitable. Usually the elevators are the stumbling block.

**How the Minneapolis Club Increased**—Approximately 300 new members have been added to the Minneapolis Automobile club through a recent campaign. More new members were enrolled than in a campaign a year ago when a \$1,300 car was offered as a prize for the best work. The method used

was simple. A series of five cards, 5000 in all, was prepared. The first read, without signature, "Who Pays." The other four were highly colored attractive views twenty-five sets which were framed separately and hung in leading garages. None of the cards solicited club membership. The committee attended to that. From among car owners not club members 1000 names were selected. These names were divided into four companies of 250 each. To each one of the first 250 card No. 1 was mailed on a Friday night.

## Coming Motor Events

### CONTESTS

- Oct. 6—Danbury, Conn., track race.
- Oct. 6—Uniontown, Pa., speedway race.
- \*Oct. 13—Chicago speedway race, championship.
- Oct. 15—Richmond, Va., track race.
- Oct. 27—New York speedway race.
- \*A. A. A. championship award event.

### MEETINGS

- Oct. 9-11—Pittsburgh, Pa., National Association of Purchasing Agents, annual congress.
- Oct. 10—Chicago Truck Owners' Association, annual meeting.
- Jan. 11-16—New York, National Association of Automobile Accessory Jobbers, convention.

### SHOWS

- Oct. 1-6—Buffalo, N. Y., closed cars.
- Oct. 6-13—Boston.
- Oct. 6-13—Cincinnati, Ohio.
- Oct. 8-13—St. Louis.
- Oct. 9-12—Toledo, Ohio.
- Oct. 13-28—Dallas, Tex., state fair.
- Nov. 5-12—Los Angeles, Cal.
- Nov. 12-18—Denver.
- Jan. 5-12—New York.
- Jan. 19-26—Montreal, Canada.
- Jan. 26-Feb. 2—Chicago.
- March 2-9—Boston.

Each successive Friday night for four weeks a card was mailed until the series was complete. When the last card was mailed each member of a committee of twenty-five was assigned ten names for personal work. Then the mailing process was followed with the second division, and so on.

### Rhode Island Now Uses Convicts on Roads

—The Rhode Island legislature has made it possible for the state board of public roads to use convict labor on highway work, and the first gang started July 10 on a 2-mile section. The cost is said to be a little lower than the contract price bid when this section was advertised last spring. A second gang of thirty-one men was started Aug. 1 on resurfacing and reconstructing a section of state highway about 1 mile long.

### Ohio Revokes Owner's License

—The first conviction under the new Ohio law, which revokes the license of an owner when convicted of driving a motor car while intoxicated, has been made in the courts of Stark county. In addition to being deprived of the use of his car for two years he was sentenced to serve ninety days in the workhouse. This is practically the maximum sentence in such offenses. The Ohio motor vehicle department is sending out news of the conviction as a warning to all owners within the state.

### Midget Buys and Drives Car

—Lord Roberts is just 30 in. tall, but he owns and drives a Maxwell. When he bought his car his salesman was the tallest in the service of the company, A. S. Gilchrist, who is 6 ft. 4½ in. Extensions on pedals and lever were necessary, and as the first lesson was being given a cop stopped the car, thinking the salesman was allowing one of the children to monkey with the steering wheel. After he becomes familiar with the extension pedals and levers Lord Roberts expects to challenge Ray McNamara, the Maxwell road engineer, to an intercity road race, it is reported.

**What Poor Roads Cost**—In a talk before 200 delegates attending the Arkansas Bankhead Highway Association, Governor Brough said that it costs Arkansas farmers 28.1 cents a mile a ton for hauling, compared with 8 or 9 cents over good roads in other states. Of the 52,000 miles of road in Arkansas before 1917, only 3 per cent was improved, according to Governor Brough, whereas the general average of improved roads in the United States is about 10 per cent. The object of the meeting was to plan for the completion of the Bankhead highway from Little Rock to the western boundary of the state, either to Fort Smith or to Texarkana.

**A Month's Motoring for Railroad Fare**—That it pays to motor is shown by the trip of an Oklahoma family to Detroit and home again recently. Coming to Detroit the family consisted of two, but returning there were three persons in the party. The vacation lasted thirty-one days and covered 4244 miles, the total expense of which was \$165. All cost was included in this amount—food, fuel, hotel bills and so on. Fare by the railroad from Ardmore, Okla., the starting place, to Detroit is \$30.15 one way. The two tickets would have cost \$60.30 and the round trip, \$120.60. The railroad fare of the third person to Ardmore would have meant an additional \$30.15, making a total of \$150.75 for railroad tickets alone. Allowing \$1 a day for living expenses just the two would have spent \$212.75 for their vacation. The average mileage per gallon of gasoline was 25¼ miles. A Maxwell was used.



# Ross Gears

THE merchant or manufacturer who knows and appreciates their superior quality in design, materials and workmanship, insists upon ROSS GEARS as steering equipment on the motor trucks that he buys. He has every reason to believe that the motor truck manufacturer who has been willing to pay a little more to give his customers the added assurance of safety, reliability and easy steering that ROSS GEARS guarantee, has probably given the same careful thought to the entire make-up of his truck. One hundred and fifteen different makes of motor trucks, representing considerably over half the industry, are steered by ROSS GEARS.

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information desired*

**ROSS GEAR & TOOL COMPANY**  
400 HEATH STREET - LAFAYETTE, INDIANA

*Manufacturers of the Steering Gears  
that Predominate on  
Motor Trucks*



*When Writing to Advertisers, Please Mention Motor Age*

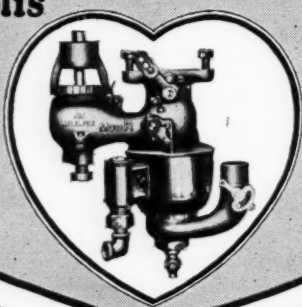


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The Common-Sense Carburetor for Passenger Cars—  
Commercial Cars and  
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Indianapolis Indiana



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# MOTOR AGE

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Vol. XXXII Chicago, October 11, 1917 No. 15

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### NEXT WEEK

What will the motor cars of 1918 be? Next week MOTOR AGE will contain an article concerning the trend of the new models, how they differ from those of 1917 and what their most distinctive features are.



**"Oh! These Are  
the Happy Hours!"**

pump—pump—pump, soiled clothes, temper tried, strength exhausted. Punctures and blowouts are bound to occur. Why not install that necessary time and labor saver—the

## KELLOGG Engine Driven Tire Pump

Be assured of properly inflated tires—any day, any time, anywhere—*pure air quick.*

Furnished as standard equipment on many of the leading automobiles. A special place is designed for immediate installation on practically all makes.

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For further information, write

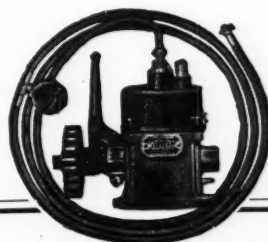
**KELLOGG MFG. CO.**  
ROCHESTER, N. Y.

[ Branches and Distributors in all  
Principal Cities

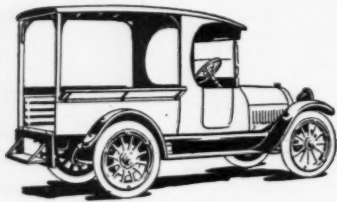
### Is Your Car Here?

BUICK  
CHALMERS  
CHANDLER  
CHEVROLET  
DODGE  
FORD  
HUDSON  
HUPMOBILE  
KISSEL  
NASH  
OLDSMOBILE  
OVERLAND  
PAIGE  
REO  
STUDEBAKER

Dealers equip  
these cars and  
many others.



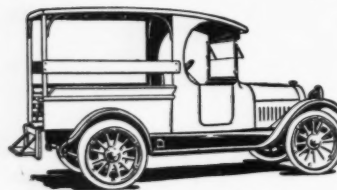
# No Idle, Profitless Days for Studebaker Dealers



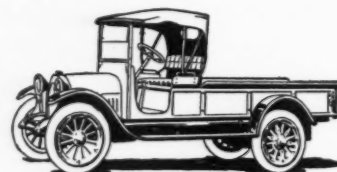
Half-ton Open Express  
\$960



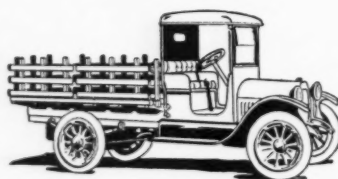
Half-ton Panel Delivery  
\$985



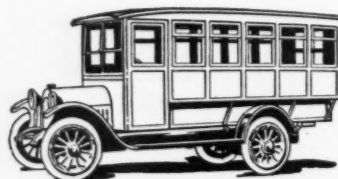
Half-ton Station Wagon  
\$985



One-ton Open Express  
\$1400



One-ton Stake Body  
\$1450



16 Passenger Bus  
\$1600  
All Prices f. o. b. Detroit

Studebaker Commercial Cars make extra sales and profits for in-between seasons. Now is the time to push their sale.

**A**ROUND the corner is a growing grocery concern that needs a Studebaker Half-ton Open Express to replace its out-of-date delivery equipment.

Across the street is a dry goods store that should have a more stylish looking delivery motor to keep up the reputation for exclusiveness that the store has won. The Studebaker Panel Delivery Car, exceptionally aristocratic in design and finish, will just meet its needs.

There's a liveryman, perhaps who could make more money with his 'bus line if he had a Studebaker Station Car or a Studebaker Sixteen Passenger 'Bus—an expressman to whom you can sell a Studebaker Half-ton or One-ton Express Car.

In fact, a careful analysis of the market for the six different Studebaker Commercial Cars shows at least fifty-one different types of business to which one or more of these cars is ideally adapted.

And the field is not limited to city business. Farmers everywhere are buying Studebaker Commercial Cars for hauling milk, grain, stock or other farm products to market.

And that only hints at the wealth of sales opportunities Studebaker offers its dealers. There need be no idle, profitless days for the dealer who has the Studebaker line.

*Write today for detailed information.*

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